Canon®
AL-1
REPAIR GUIDE

PREFACE

This Repair Guide is issued as a part of the Service Manual for the Canon AL-1. Its purpose is to insure the continued high quality of the camera through correct repair procedures.

The Tools List is also included on this microfiche, which is titled the Repair Instructions. Separate microfiche titled Parts Catalog and General complete the Service Manual. The main sheet number for all sheets is C-054. This and the General microfiche also have a suffix number -1E. The 1 indicates the first sheet of a possible series and the E indicates that the language is English.

Any comments or suggestions will be appreciated.

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INTRODUCTION

1. Special Repair Instructions

1.1. Exposure and Winding adjustments are identical to the AV-1. Normally they would not have been included, but they have been.

1.2. Instructions concerning the Focus adjustments.

A. DO NOT REVERSE THE POLARITY ON THE D.C.-D.C. CONVERTOR when attaching a power supply. If polarity is reversed the capacitor in the converter will explode.

B. To determine if the camera focusing is defective or the subject is not suitable, check the camera by focusing on a chart.

C. A D.C. power supply to power the chart illumination is very helpful, and the chart should not be lit by and A.C. light source.

D. As with the AF 514XL-S and AF 35 M, the best distance for test is 2.5 to 3 meters.

2. Glossary of Terms

Terms new to Canon service literature are listed below.

JUST FOCUS: The signal, indicator, and conditions which cause the center, green focus indicator to light. This indicates that the lens is correctly focused.

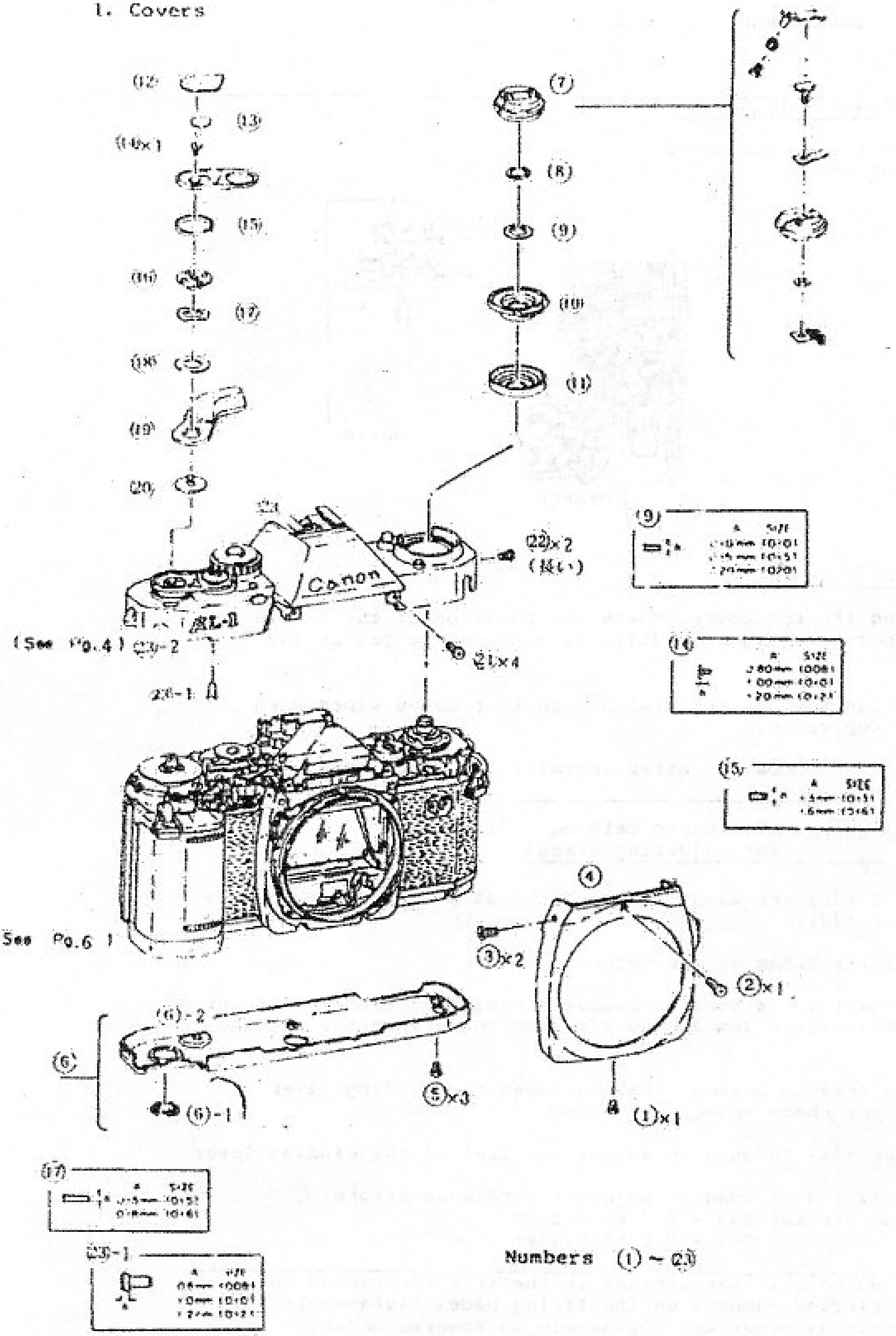
FRONT FOCUS: The signal, indicator, and conditions which cause the right, red focus indicator to light. This indicates that the lens is focused in front of the subject.

REAR FOCUS : The signal, indicator, and conditions which cause the left, red focus indicator to light. This indicates that the lens is focused behind the subject.

4

I. ASSEMBLY and DISASSEMBLY

1. Covers


(12)
(13)
(14)×1
(15)
(16)
(17)
(18)
(19)
(20)
(23)
(7)
(8)
(9)
(10)
(11)
(22)×2
(14+)
(21)×4
Canon
AL-1
(See Pg.4) (23-2)
(23-1)
(See Pg.6)
(4)
(3)×2
(2)×1
(6)-2
(6)
(5)×3
(6)-1
(1)×1
(9) A SIZE 1.0mm (0.10) 1.5mm (0.15) 2.0mm (0.20)
(14) A SIZE 0.80mm (0.08) 1.00mm (0.10) 1.20mm (0.12)
(15) A SIZE 1.5mm (0.15) 1.6mm (0.16)
(17) A SIZE 0.5mm (0.05) 0.6mm (0.06)
(23-1) A SIZE 0.8mm (0.08) 1.0mm (0.10) 1.2mm (0.12)

Numbers (1) ~ (23)

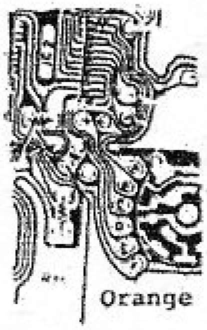
I. ASSEMBLY and DISASSEMBLY

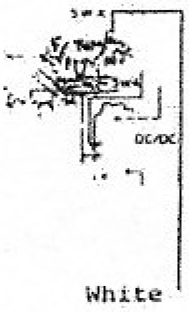
1. Covers

Assembly and Disassembly Notes

1. Be careful with the top cover leads to the hot shoe.

2. Don't loose the Shutter Release Rod (23)-1.





Adjustment Notes

1. When removing the top cover, check the position of the S-L lever [shown dotted between (14) and (15)]. It must not be set at the S position.

2. Correctly align the shutter dial and shutter speed wiper when installing the top cover.

3. Check self timer operation after installing the top cover.

Adjustment Tolerances (See parts catalog for adjusting sizes)

1. Washers (9) & (10) are used to remove thrust play and wobble from the shutter dial (11).

Tolerance limit: 0.5mm on circumference

2. Shoulder screw (14) is used to remove thrust play from the finger rest. Tolerance limit: 0.3mm.and no scraping sound when the winding lever is moved

3. Ring (15) is used to prevent space between the winding lever and S-L lever. Maximum space tolerance: 0.3mm

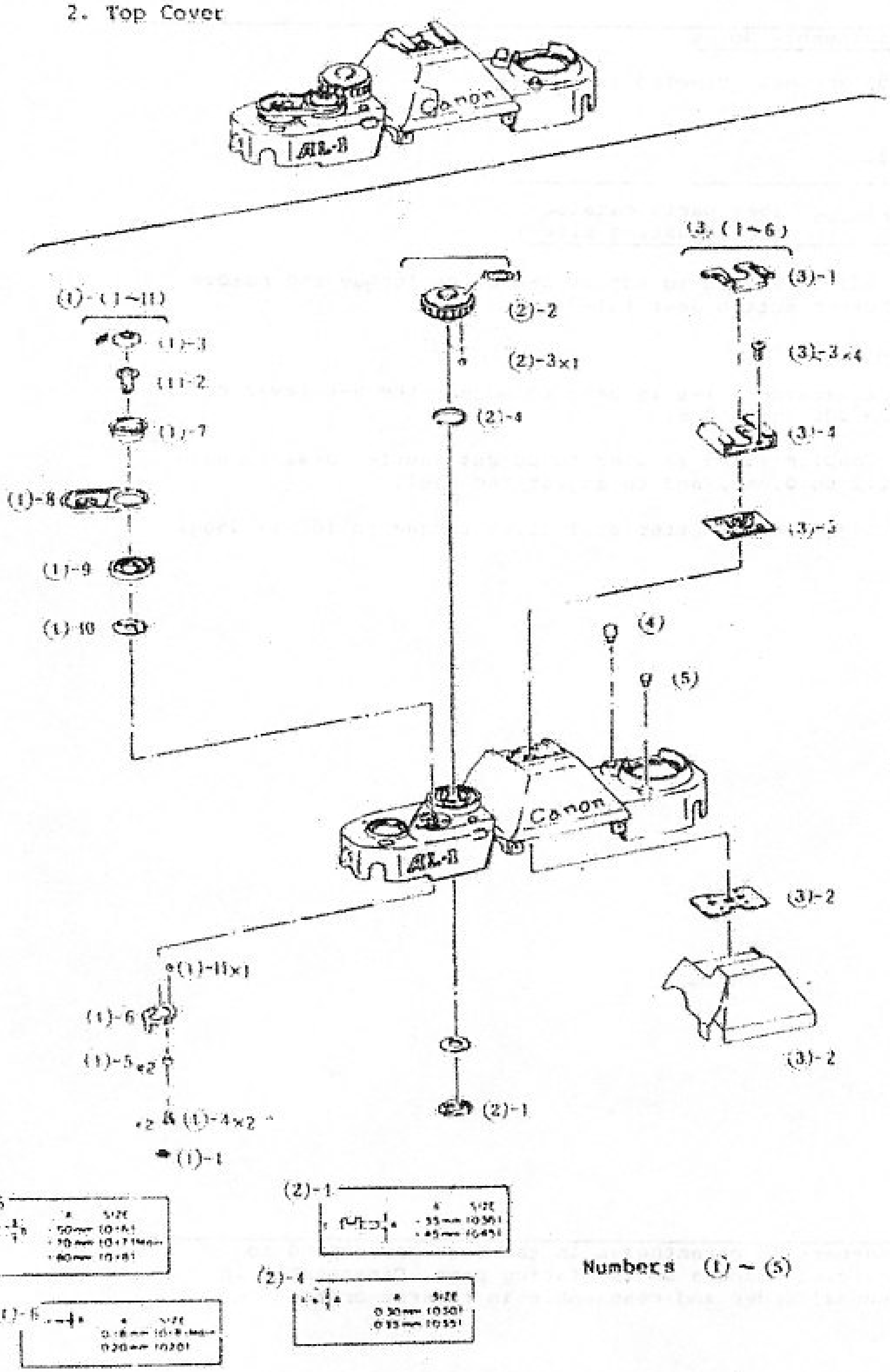
4. Spring washer (17) is used to adjust the feel of the winding lever.

5. Release pin (23)-1 is used to adjust the release stroke.
Release Stroke: SW1 = 0.1 to 0.5 mm
SW2 = 0.6 to 0.10mm

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

2. Top Cover


Canon
AL-1
(1)-(1~11)
(1)-3
(1)-2
(1)-7
(1)-8
(1)-9
(1)-10
(2)-2
(2)-3×1
(2)-4
(3)-(1~6)
(3)-1
(3)-3×4
(3)-4
(3)-5
(4)
(5)
(1)-11×1
(1)-6
(1)-5×2
(1)-4×2
(1)-1
(2)-1
(3)-2
(3)-2
(1)-5
B SIZE
.50mm (0.6)
.70mm (0.7 Marked)
.80mm (0.8)
(1)-6
B SIZE
0.18mm (0.18 Marked)
0.20mm (0.20)
(2)-1
B SIZE
.35mm (0.35)
.45mm (0.45)
(2)-4
B SIZE
0.30mm (0.30)
0.35mm (0.35)
Numbers (1) ~ (5)

1. ASSEMBLY and DISASSEMBLY

2. Top Cover

Assembly and Disassembly Notes

Buttons (4) & (5) are heat riveted in place.

Adjustment Notes

Adjustment Tolerances (See parts catalog for adjusting sizes)

1. Click Collar (1)-5 is used to adjust S-L click torque and remove play from the Shutter Button Seat (1)-7.

   Tolerance limit: 0.3mm

2. Self-timer Activacator (1)-6 is used to adjust the S-L lever click torque to between 200 and 350 g.

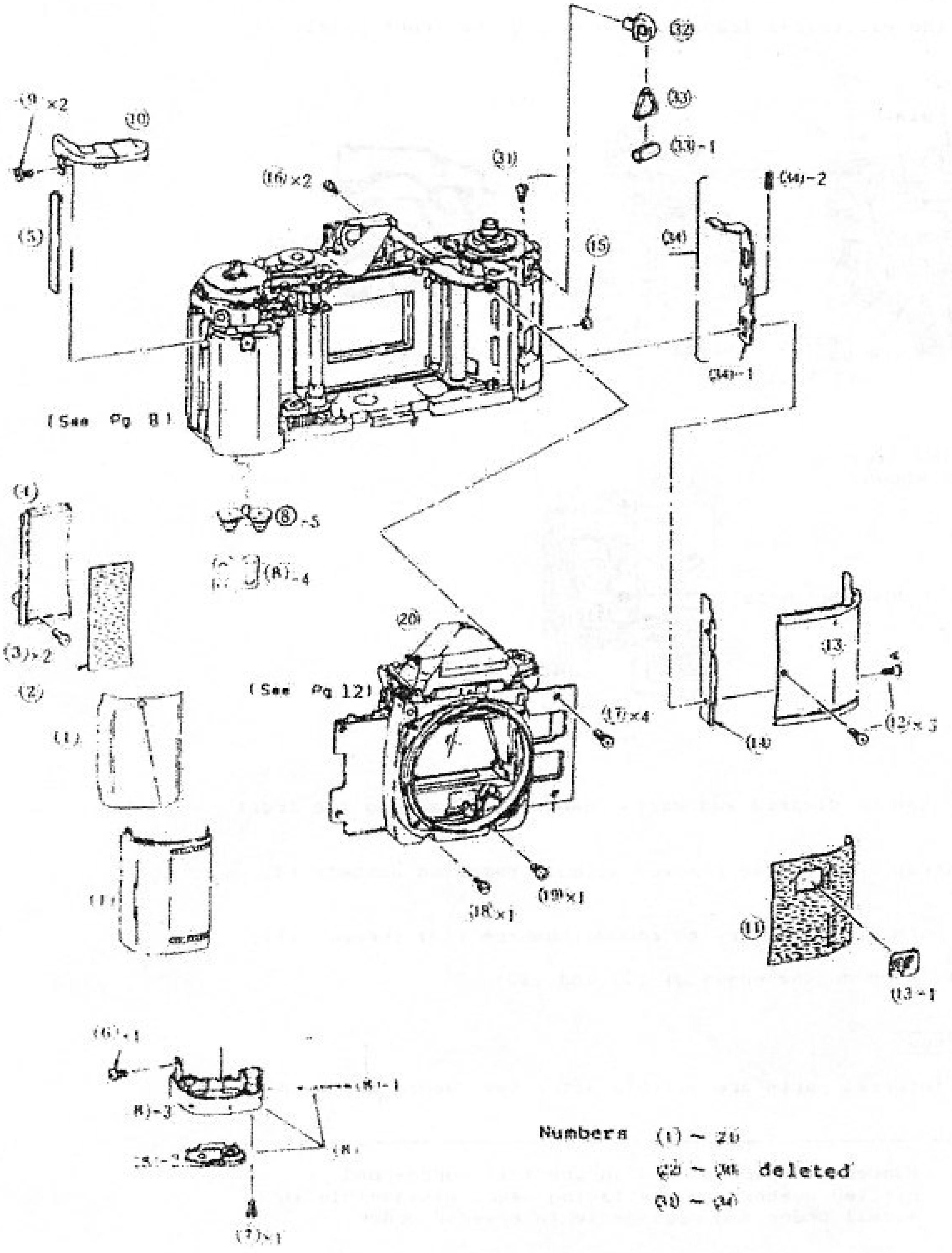
3. Shutter Dial Coupler (2)-1 is used to adjust shutter dial thrust play to within 0.2 to 0.3mm, and to adjust the feel.

4. Washer (2)-4 adjust the shutter dial click torque to 300 +- 150g.

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

1. ASSEMBLY and DISASSEMBLY

3. Front Panel Removal


(9)×2
(10)
(5)
(16)×2
(31)
(32)
(33)
(33)-1
(34)-2
(34)
(15)
(34)-1
(See Pg 8)
(4)
(8)-5
(8)-4
(3)×2
(2)
(1)
(11)
(20)
(See Pg 12)
(17)×4
(13)
(12)×3
(14)
(18)×1
(19)×1
(11)
(13-1)
(6)×1
(8)-1
(8)-3
(8)
(8)-2
(7)×1

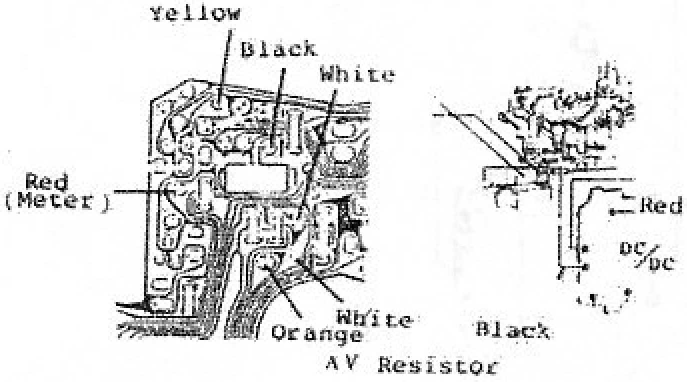
Numbers (1) ~ 21
(22) ~ (30) deleted
(31) ~ (34)

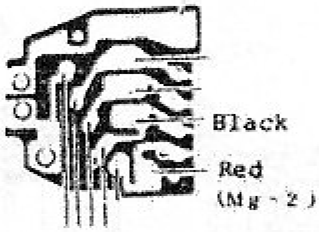
ASSEMBLY and DISASSEMBLY

3. Front Panel Removal

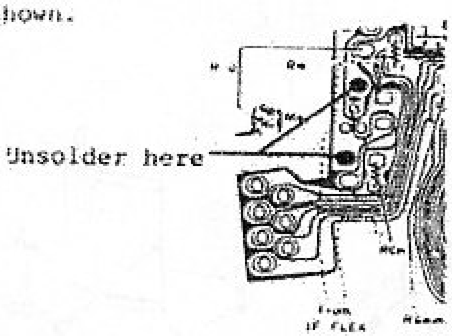
Assembly and Disassembly Notes

1. Unsolder the electrical leads when removing the front panel.


Yellow
Black
White
Red (Meter)
White
Orange
AV Resistor
Red
DC/DC
Black


Black
Red (Mg-2)

2. Unsolder the flex at the points shown.


Unsolder here

3. The finder can be cleaned and parts changed by removing the front panel (20).

4. The neck strap lugs can be removed without removing numbers (1) through (21).

5. It is not normally necessary to remove numbers (31) through (34).

6. Plyobond is used on the edges of (1) and (10).

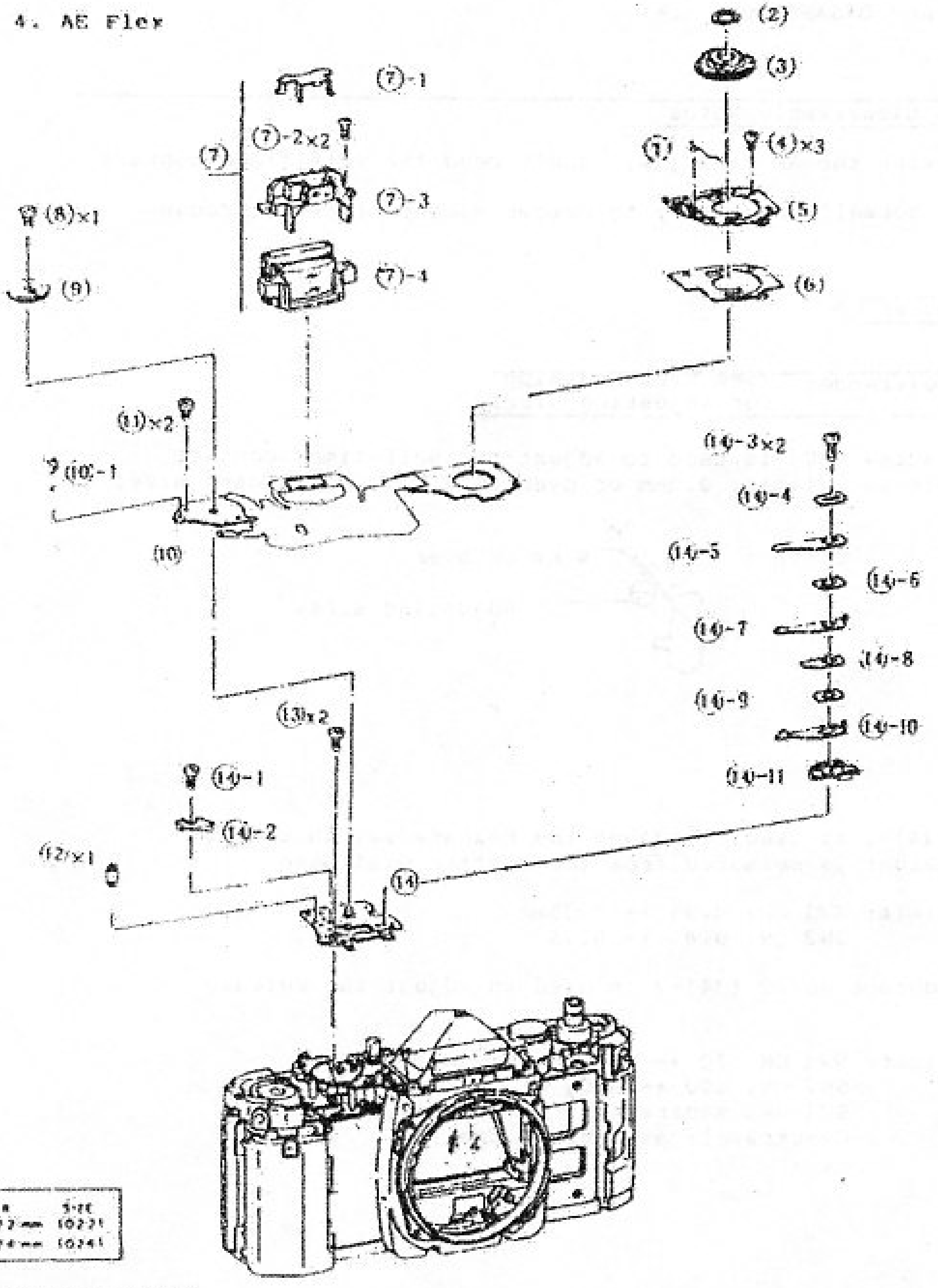
Adjustment Notes

Make sure no internal parts are visible after the camera has been assembled.

Note: Numbers in parentheses in the text correspond o circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

1. ASSEMBLY and DISASSEMBLY

4. AE Flex


②
③
⑦-1
⑦-2×2
⑦
⑦-3
⑦-4
⑧×1
⑨
①
④×3
⑤
⑥
⑪×2
⑩-1
⑩
⑭-3×2
⑭-4
⑭-5
⑭-6
⑭-7
⑭-8
⑭-9
⑭-10
⑭-11
⑬×2
⑭-1
⑭-2
⑫×1
⑭

⑫

A	B	SIZE
	φ2.2mm	(022)
	φ2.4mm	(024)

⑭-2

B	A	SIZE
	0.7mm	(070)(White)
	0.8mm	(080)(Black)

⑭-7

B	A	SIZE
	0.35mm	(035)
	0.40mm	(040)

⑭-8

A	SIZE
[illegible]	[illegible]
[illegible]	[illegible]

Numbers ① ~ ⑭

⑦-2 ~ ⑦-4 normally need not be removed

I. ASSEMBLY and DISASSEMBLY

4. AE Flex

Assembly and Disassembly Notes

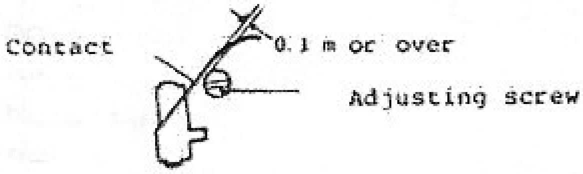
1. When removing the AF flex (10), don't bend the self-timer contact.

2. It is not normally necessary to remove numbers (7)-2 through (7)-4.

Adjustment Notes

Adjustment Tolerances (See parts catalog for adjusting sizes)

1. Shoulder screw (10) is used to adjust the self-timer contact spacing. Tolerance limit: 0.1mm or over(SIZE 022 is standard size)



2. Stopper (14)-2 is used to adjust the release switch contact height. The height is measured from the shutter dial base.

Tolerance limit: SW1 ON: 1.35 +- 0.15mm
SW2 ON: 0.85 +- 0.15

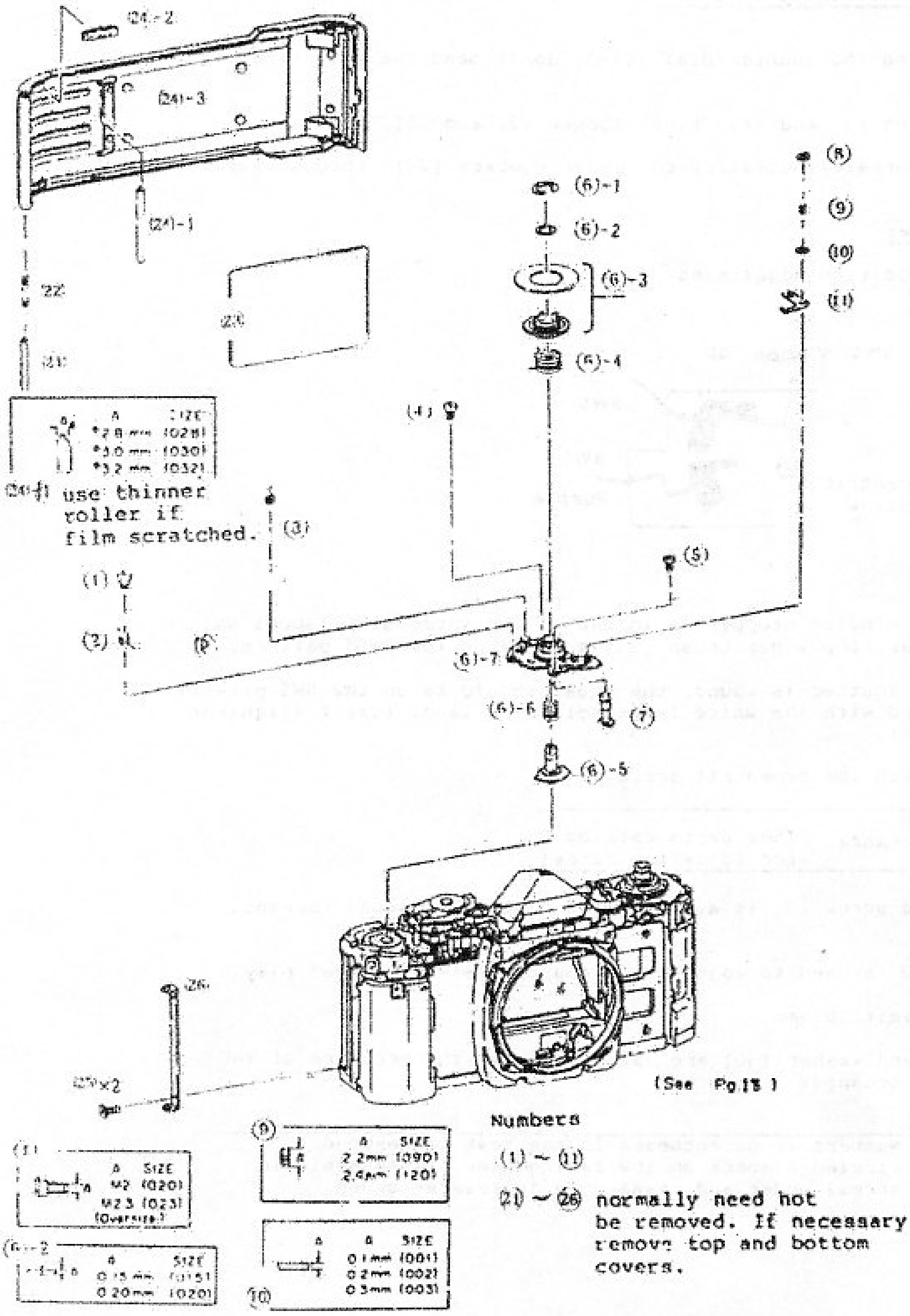
3. Release Contact No. 2 (14)-7 is used to adjust the release pressure.

Tolerance limit: SW1 ON: 70 +- 20g
SW2 ON: 600 +- 100g
SW1-SW2 separation: at least 0.2mm
Overtravel: at least 0.3mm

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

5. Back Cover, Winding Base


(24)-2
(24)-3
(24)-1
22
23
21
A SIZE
*2.8 mm (028)
*3.0 mm (030)
*3.2 mm (032)
(24)-1
(8)
(9)
(10)
(11)
(6)-1
(6)-2
(6)-3
(6)-4
(4)
(3)
(5)
(1)
(2)
(6)-7
(6)-6
(7)
(6)-5
26
(25)×2
(See Pg.13)
(1)
A SIZE
M2 (020)
M2.3 (023)
(Oversize)
(6)-2
A SIZE
0.15 mm (015)
0.20 mm (020)
(9)
A SIZE
2.2mm (090)
2.4mm (120)
(10)
A SIZE
0.1mm (001)
0.2mm (002)
0.3mm (003)

use thinner roller if film scratched.

Numbers

(1) ~ ⑪

㉑ ~ ㉖ normally need hot be removed. If necessary removv top and bottom covers.

1. ASSEMBLY and DISASSEMBLY

5. Back Cover, Winding Base

Assembly and Disassembly Notes

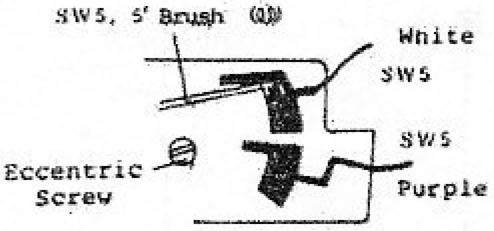
1. When removing the counter dial (6)-3, don't bend the self-timer contact.

2. When removing (1) and (4), first loosen (2) and (3).

3. It is not normally necessary to remove numbers (21) through (26).

Adjustment Notes

Sw5-5' Brush Position Adjustment



1. When the winding stopper is in one of the three blank spots on the winding gear, the wiper brush (11) must be on the SW5' pattern.

2. When the shutter is wound, the brush should be on the SW5 pattern and aligned with the white leads soldering land. (Exact alignment is not critical).

3. Adjust with the eccentric screw.

Adjustment Tolerances (See parts catalog for adjusting sizes)

1. An oversized screw (1) is available in case of stripped threads.

2. Washer (6)-2 is used to adjust film counter (6)-3 vertical play.

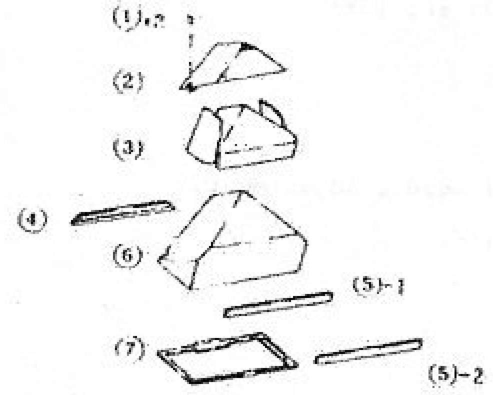
Tolerance limit: 0.5mm

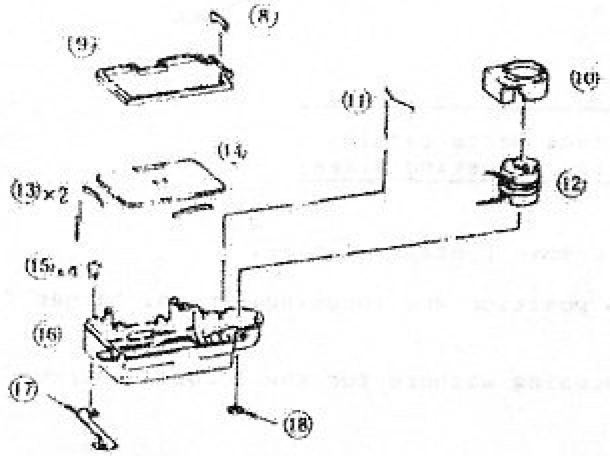
3. Spring (9) and washer (10) are used to adjust the pressure of the SW5-5' pattern brush(1).

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

6. Finder Optics, Meter


(1)×2
(2)
(3)
(4)
(6)
(5)-1
(7)
(5)-2


(8)
(9)
(10)
(11)
(14)
(13)×2
(12)
(15)×4
(16)
(17)
(18)

(5)-2

A	SIZE
0.15mm	(015)
0.25mm	(025)

(5)-1

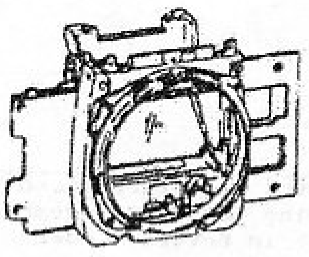
A	SIZE
0.3mm	(030)
0.5mm	(050)

(13)

A	SIZE
0.05mm	(005)
0.10mm	(010)

(17) (18)

A	SIZE
0.05mm	(005)
0.10mm	(010)
0.15mm	(015)
0.20mm	(020)
0.25mm	(025)
0.30mm	(030)
0.35mm	(035)
0.40mm	(040)



Numbers (1) ~ (18)

6. Finder Optics, Meter

Assembly and Disassembly Notes

1. Don't loose the focus washers (17) and (18).

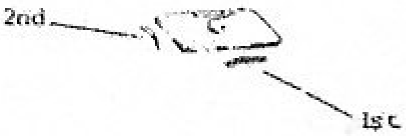
2. Don't bend the meter needle.

Adjustment Notes

1. See section II.2.5 for meter (12) needle adjustment.

2. Apply dust gard tape to (6) and (16).

3. Install the focusing screen springs (13) in the order shown.



Adjustment Tolerances (See parts catalog for adjusting sizes)

1. (5)-1,2 are used to remove pentaprism play.

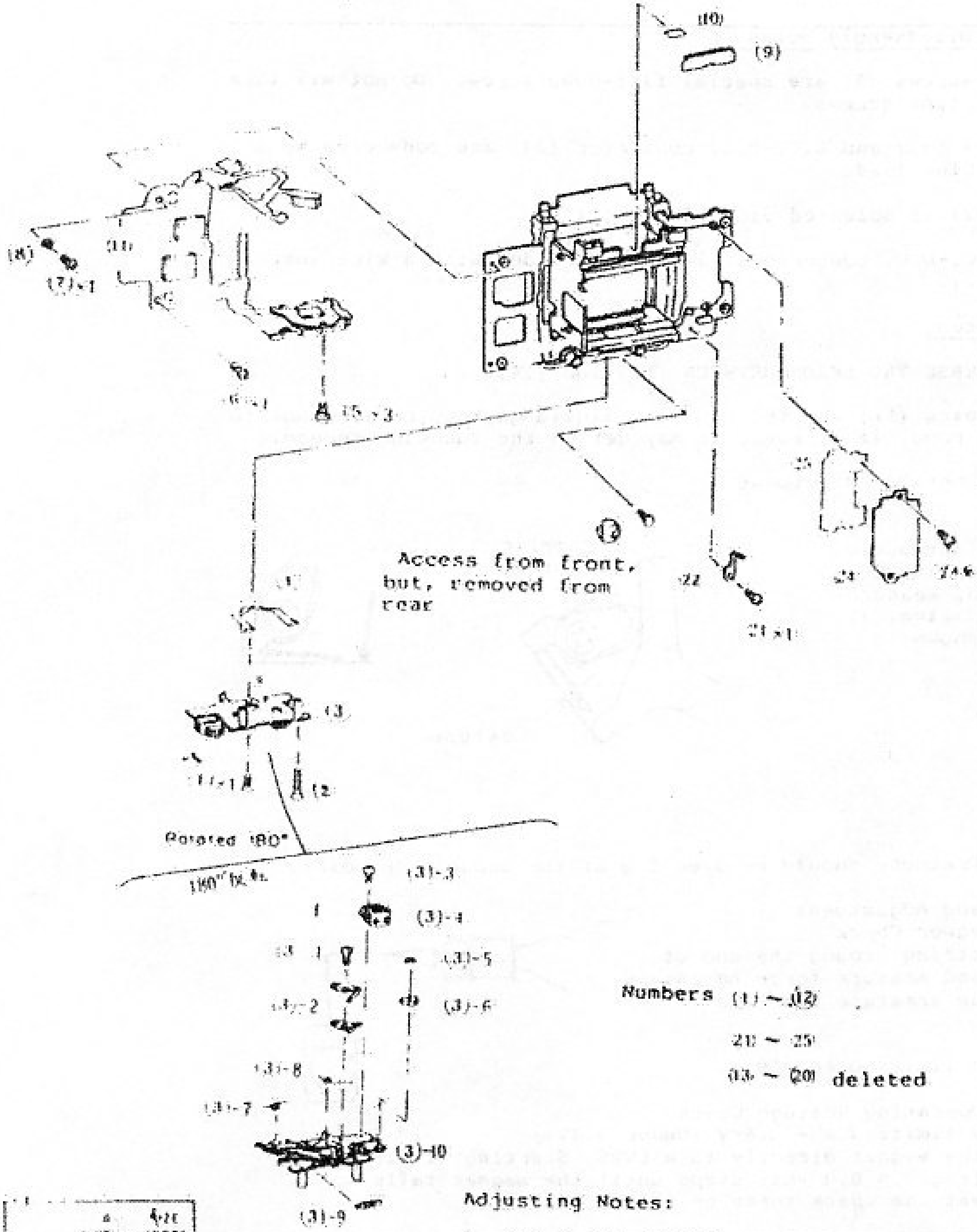
2. (13) x 2 are used to position the focusing screen. Larger "Sizes" are stronger.

3. (17) and (18) are focusing washers for the focusing screen.

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

7. IF Flex, Automatic Diaphragm Unit


(10)
(9)
(11)
(8)
(7)×1
(6)×1
(5)×3
(12)
(25)
(24)
(24)×1
(22)
(21)×1
(1)
(3)
(1)×1
(2)
Rotated 180°
(3)-3
(3)-4
(3)-1
(3)-5
(3)-2
(3)-6
(3)-8
(3)-7
(3)-10
(3)-9

Access from front, but, removed from rear

Numbers (1) ~ (12)

(21) ~ (25)

(13) ~ (20) deleted

A	SIZE
0.05mm	(005)
0.10mm	(010)
0.15mm	(015)
0.20mm	(020)
0.30mm	(030)
0.40mm	(040)
0.70mm	(070)

(10)

A	SIZE
0.10mm	(010)
0.20mm	(020)

Adjusting Notes:

1. (4) is the CCD focus adjusting shim. See section II.3.7.
2. (10) is used to remove LCD vertical play.

1. ASSEMBLY and DISASSEMBLY

7. IF Flex, Automatic Diaphragm Unit

Assembly and Disassembly Notes

1. The three screws (5) are special flat-head screws. Do not mix them with standard type screws.

2. The IF flex (12) and D.C.-D.C. convertor (24) are connected by a yellow and a blue lead.

3. Contact (22) is soldered directly to (24).

4. Certain D.C.-D.C. convertors (24) are grounded with a wire instead of contact (22).

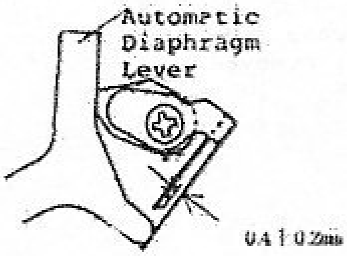
Adjustment Notes

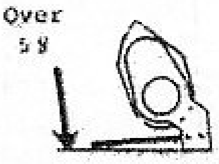
1. DO NOT REVERSE THE LEADS BETWEEN (11) and (24)

2. When rebonding (11) and the LED with liquid gasket, be sure not to use excessive bond. If it runs, it may get on the focusing screen.

3. Indicator Contact Adjustment

3.1. With the Automatic diaphragm lever in the start position, measure the contact spacing. It should be as shown below.



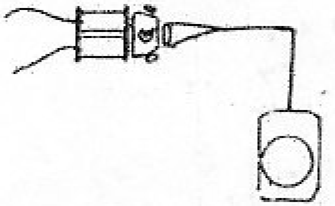


3.2. Contact Pressure should be over 5 g at the separation point.

4. Mg2 Check and Adjustment

4.1. Holding Power Check

Place a string around the end of the armature and measure force necessary to separate the armature from the magnet.



Tolerance limit: Over 150 g

4.2. Minimum Operating Voltage Check

Tolerance limit: 1.4 - 1.6 V (Under 1.7V)

Connect the magnet directly to a LVPS. Starting at 1.8V, reduce the voltage in 0.1 volt steps until the magnet fails to operate. Repeat the check three or four times.

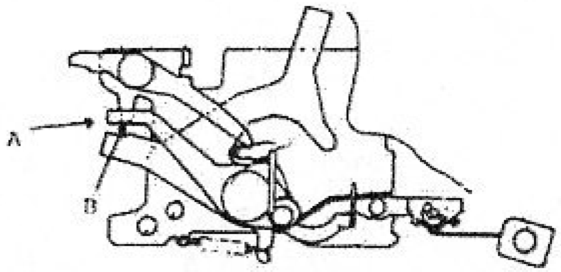
Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

Assembly and Disassembly Notes

4.3. Armature Spring Tension

Tolerance limit: 80 to 120 g

Press in the arrow marked direction (A) with a tension gage. Mdasure the tension when the edge of the lever is just even with the point (B) on the protrusion from the base.



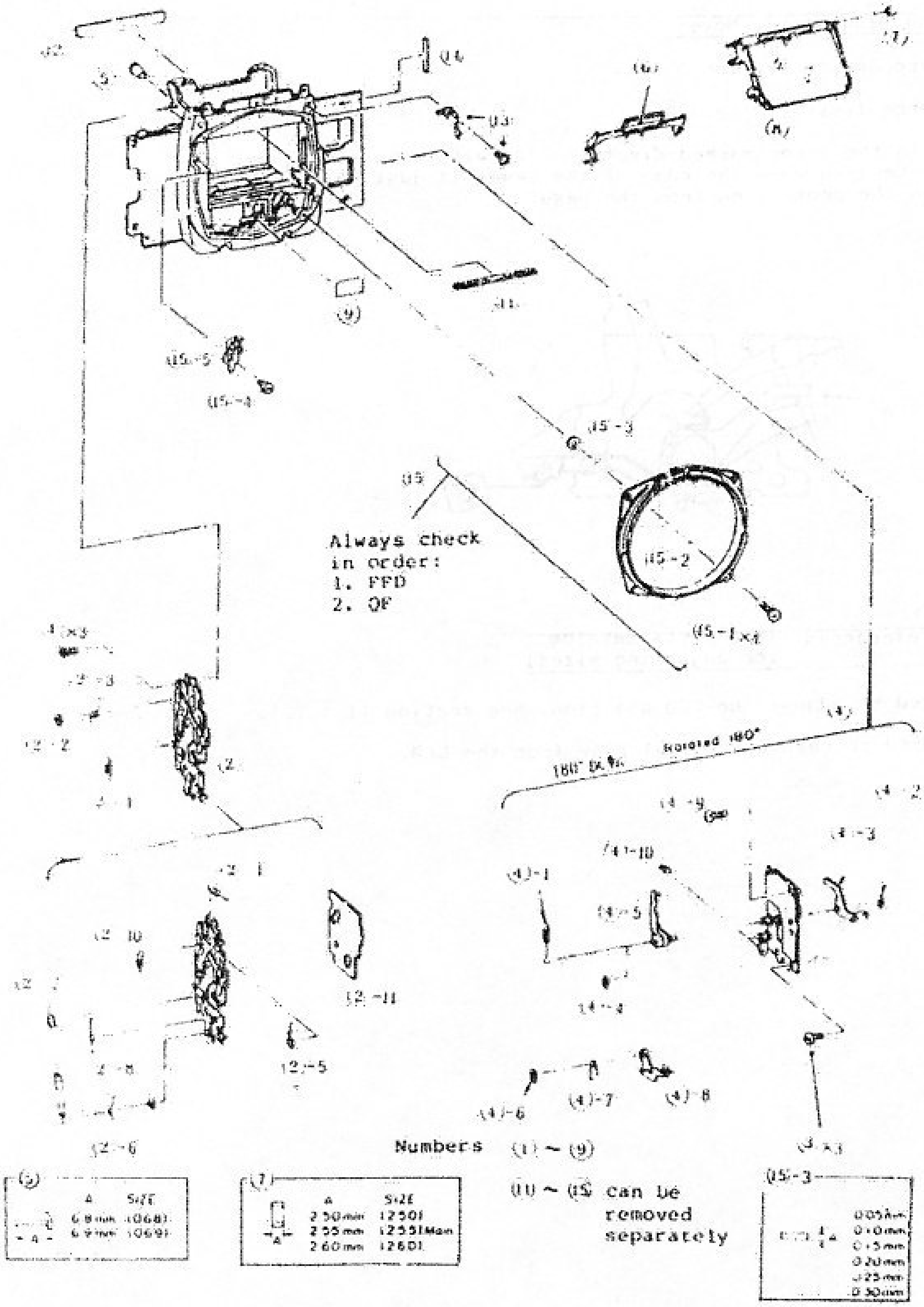
Adjustment Tolerances (See parts catalog for adjusting sizes)

1. (4) is used to adjust the CCD position. See section II.3.7.3.

2. (10) is used to remove vertical play from the LED.

I. ASSEMBLY and DISASSEMBLY

8. Mirror, Mirror Mechanism & AV Resistor


(12)
(5)
(14)
(13)
(6)
(1)
(8)
(9)
(11)
(15)-5
(15)-4
(15)-3
(15)
(15)-2
(15)-1×4
(4)
Rotated 180°
180° turn
(2)
(2)-3
(2)-2
(2)-1
(2)-10
(2)-11
(2)-5
(2)-6
(2)-8
(4)-1
(4)-2
(4)-3
(4)-4
(4)-5
(4)-6
(4)-7
(4)-8
(4)-9
(4)-10
(3)×3
A

Always check
in order:
1. FFD
2. OF

Numbers (1) ~ (9)

(11) ~ (15) can be
removed
separately

(5)

A	SIZE
6.8mm	(068)
6.9mm	(069)

(7)

A	SIZE
2.50mm	(250)
2.55mm	(255)Main
2.60mm	(260)

(15)-3

0.05mm
0.10mm
0.15mm
0.20mm
0.25mm
0.30mm

I. ASSEMBLY and DISASSEMBLY

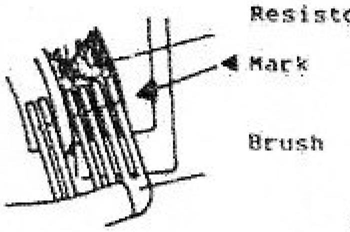
8. Mirror, Mirror Mechanism & AV Resistor

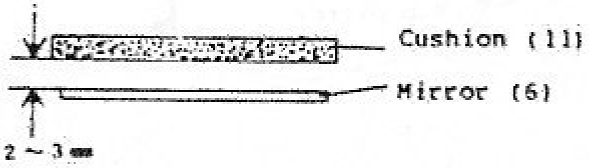
Adjustment Notes

1. AV Resistor Unit (4) Installation

1.1. The AV Resistor Unit is the same unit as is used in the AV-1 but improvements in individual parts tolerances have made adjustments unnecessary. (This is also true of present AV-1's.) But if either (4)-8 or (4)-10 is changed or moved, perform the following checks.

1.2. Check
The contact point of the brush (4)-8 should align with the triangular mark (part of the printed pattern) to the right of the resistor pattern. Adjust with screw (4)-10.





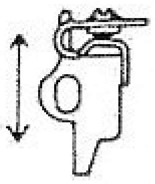
2. Main Mirror

2.1. The fully up position of the main mirror should be at 0 +0.2 mm with respect to the lower edge of the shock absorbing cushion (11). (In other words, it should compress the cushion slightly). If this is not properly adjusted, the mirror may not return properly or there may be a light leak.

2.2. Curtain Release Point
The 1st curtain release should be released when the mirror is at a point two to three mm below the lower edge of the foam cushion (11).

2.3. Mirror Light Shield Closing

When looking through the film aperture, the light shield should be completely closed at least 0.1mm before the main mirror reaches the top of its travel. You can tell when the light shield is completely closed when you can no longer see reflections of the main mirror through the slit between the main and light shield. Adjust with (8) and (9).



Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

8. Mirror, Mirror Mechanism & AV Resistor (cont.)

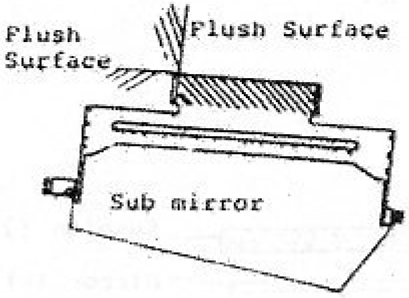
Adjustment Notes

2.3. Main Mirror Positioning

The main mirror must be positioned exactly. This requires special tools. The mirror unit only will be stocked until further notice.

2.4. Sub Mirror Positioning

Attach the mirror flush with the edges shown with double-stick tape.



2.5. Mirror Angle Adjustment

	X Axis	Y Axis
Main Mirror	0+-3'	0+-8'
Sub Mirror	0+-3'	0+-8'
	(Vert.)	(Horiz.)

2.6. Maximum Aperture Pin Height

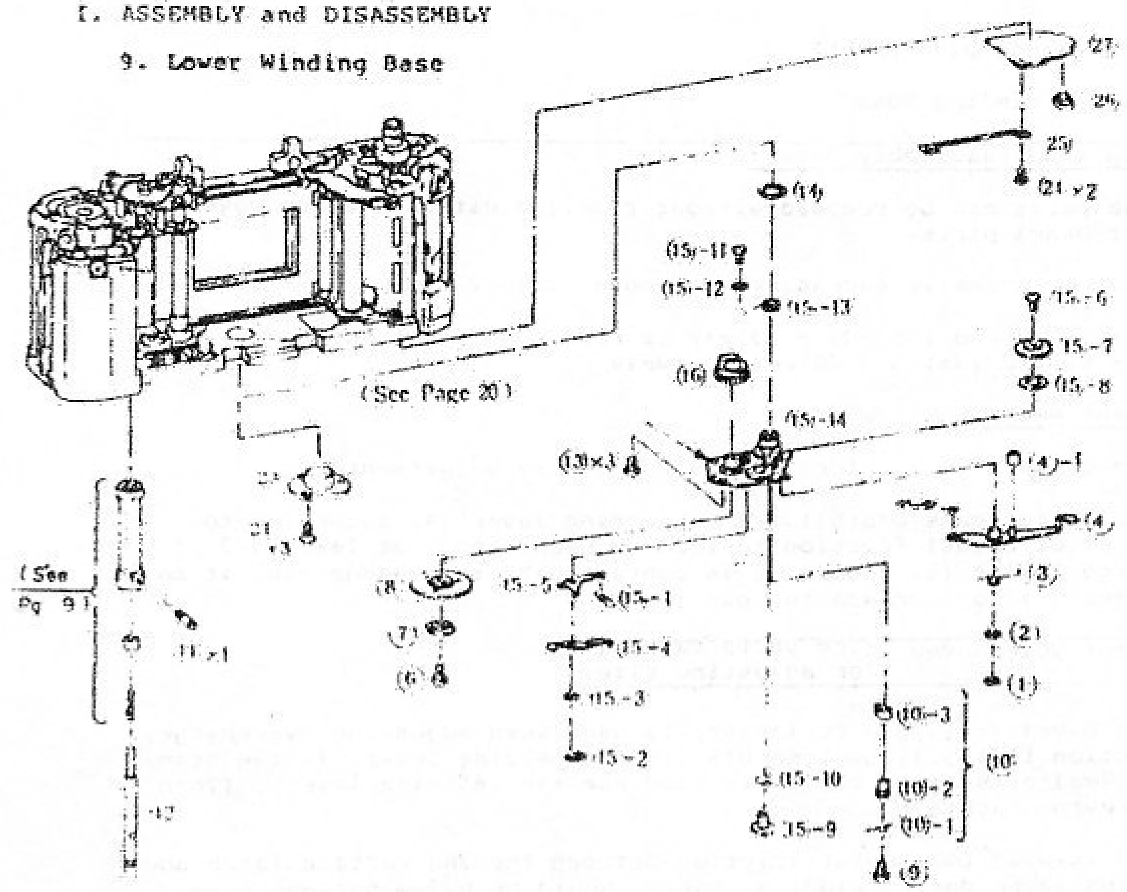
The height of the maximum aperture signal pin should be $= 6.9^{+0.05}_{-0.2}$ mm from the mount surface.

Adjustment Tolerances (See parts catalog for adjusting sizes)

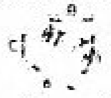
1. (7) is used to adjust main mirror play and action.

I. ASSEMBLY and DISASSEMBLY

9. Lower Winding Base

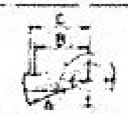

(27)
(26)
(25)
(21)×2
(14)
(15)-11
(15)-12
(15)-13
(15)-6
(15)-7
(15)-8
(16)
(See Page 20)
(15)-14
(13)×3
(4)-1
(4)
(3)
(2)
(1)
23
21 ×3
(See Pg 9)
(11)×1
12
(8)
(7)
(6)
(15)-5
(15)-1
(15)-4
(15)-3
(15)-2
(15)-10
(15)-9
(10)-3
(10)-2
(10)-1
(10)
(9)

(4)


PUNCH MARK
A
B
C

A	B	C	SIZE
ϕ2.49 mm	ϕ2.40 mm	1.43 mm	(049) No Mark
ϕ2.69 mm	ϕ2.60 mm	1.30 mm	(069) Mark

(10)-3



A	B	C	SIZE
R5.2 mm	4.3 mm	4.85 mm	(052) Main
R5.7 mm	4.8 mm	5.35 mm	(057) Yellow

4-1 CA1-3572

A	SIZE
ϕ2.6 mm	(026) Other
ϕ2.9 mm	(029) Milky
ϕ3.2 mm	(032) Black

(15)-3 XD1-1163-120 XXX

A
120 (　　)
121 (　　)

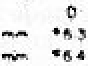
(5)

A	SIZE
ϕ3.0 mm	(030)
ϕ3.2 mm	(032)
ϕ3.3 mm	(033)
ϕ3.4 mm	(034)
ϕ3.5 mm	(035)
ϕ3.6 mm	(036)
ϕ3.7 mm	(037) Main
ϕ3.8 mm	(038)
ϕ4.0 mm	(040)

(15)-8 CA1-1246

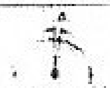
A	SIZE
0.1 mm	(100)
0.2 mm	(200)

(15)-13



d	D	SIZE
0.30 mm	ϕ6.3 mm	(303)
0.30 mm	ϕ6.4 mm	(304)
0.30 mm	ϕ6.5 mm	(305)

CG9-2565-000



A	SIZE	SCREW
0°	(010)	Black
3°45'	(050)	

Numbers (1) ~ (15)

(21) ~ (27)

(16) ~ (20) deleted

㉕ ~ ㉗ normal need not be removed.

⑮-11 ~ ⑮-13 can be removed without removing ⑮-1 ~ ⑮-10

⑮-6 ~ ⑮-10 can be removed without removing ⑮-1 ~ ⑮-5

I. ASSEMBLY and DISASSEMBLY

9. Lower Winding Base

Assembly and Disassembly Notes

1. These parts can be removed without removing either the top cover or front panel parts.

2. It is not normally necessary to remove (22)-(27).

3. (15)-6 - 10 and (15)-11 - 13 may be removed without regard to (15)-1 - 6, and (15)-1 - 10 respectively

Adjustment Notes

1. See section II.4.2. for lower winding base adjustments.

2. Match charge cams[p/q(8)] and connecting lever (4) according to the amount of mutual friction surface between them At least 1/2 of the charge collar (5) should be in contact with the charge cam. If not use washer (3) to increase the overlap.

Adjustment Tolerances (See parts catalog for adjusting sizes)

1. If an oversize (3.8mm or larger) is used when adjusting overcharge, (See section II.4.5.), use the 049 size connecting lever. If the standard (3.7mm) or smaller collar is used use the 065 size lever. (This is to prevent backlash.

2. (4)-1 is used to prevent friction between the 2nd curtain latch and connecting lever during winding. There should be 0.2mm between them.

With the shutter wound, there should be space between the 2nd curtain charge spring and the lever collar (4)-1.

3. Collar (5) is for overcharge adjustment (See section II.4.5.). A 0.2mm change in collar diameter results in a change of 0.32mm in the overcharge.

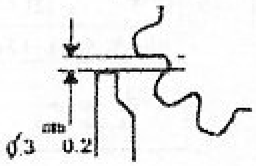
4. Charge Gear (7) affects the film perforation position. (See section II.4.1) Note: Black screws indicate the 010 size gear.

5. Pawl (10)-3 is used to prevent backlash. Use the size which gives the correct distance between the gear and pawl.

Wind and hold at the fully wound position.

The pawl should not reach next tooth.

Check the charge cam at all three positions.



Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

9. Lower Winding Base (cont.)

Assembly and Disassembly Notes

6. Use the washer (15)-8 which gives the smoothest operation of gear (15)-7. Standard: t=0.2mm

7. Spring (15)-13 is used to adjust the anti-backlash torque.
Check: Measure the torque at the circumference of gear (15)-7

Standard:

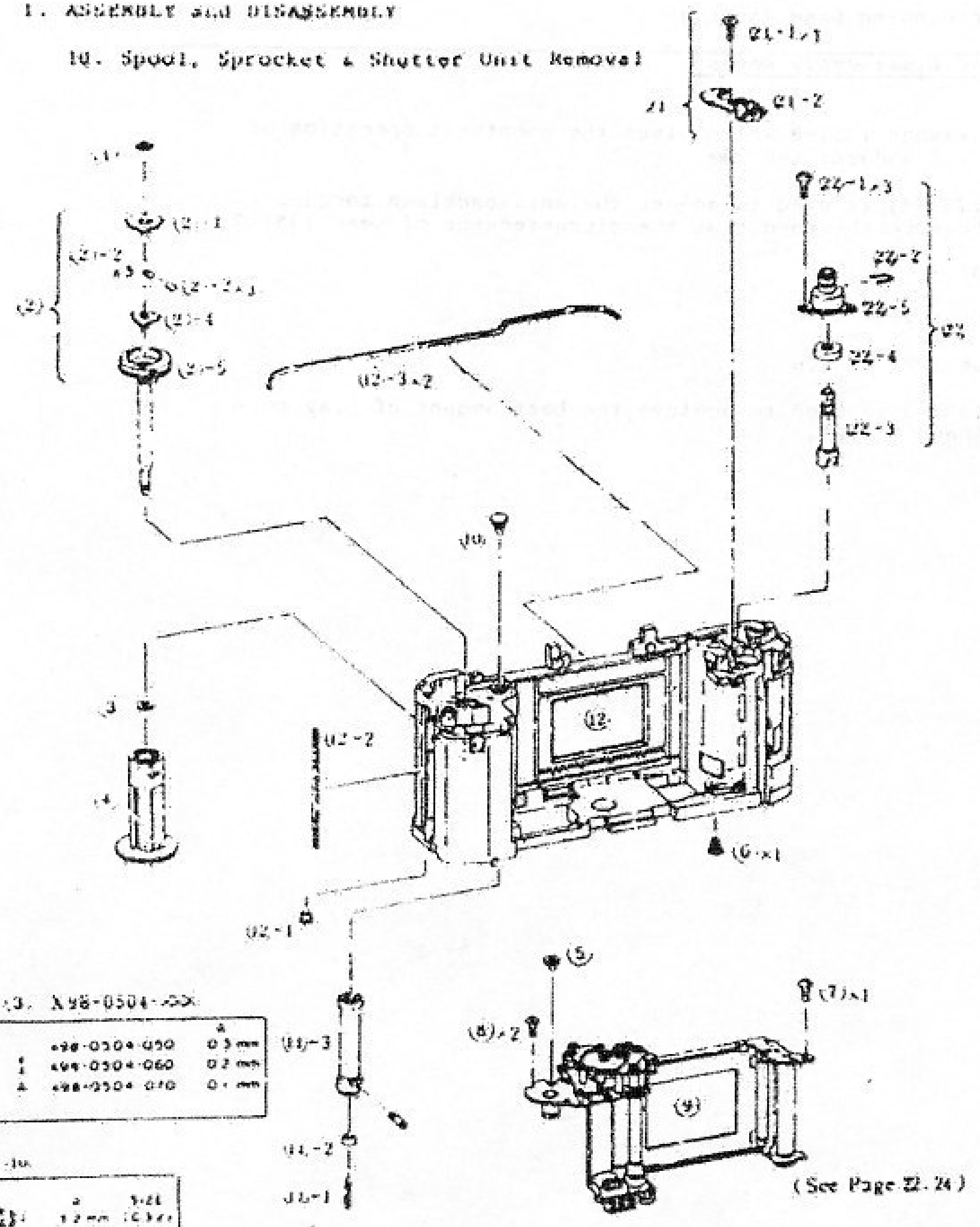
Forward : 25 - 45 g

Reverse : 80 - 130g

8. Washer (15)-3 is used to achieve the best amount of play between (15)-4 and (15)-5.

I. ASSEMBLY and DISASSEMBLY

10. Spool, Sprocket & Shutter Unit Removal


21-1x1
21-2
21
(1)
(2-1)
(2-2)
(2-2)x1
(2)
(2)-4
(2)-5
22-1x3
22-2
22-5
22-4
22
22-3
02-3x2
(10)
(12)
(3)
02-2
(4)
(6)x1
02-1
(5)
(7)x1
(8)x2
(11)-3
(9)
(11)-2
(11)-1

(See Page 22. 24)

(3). X98-0504-XXX

		A
	X98-0504-050	0.3 mm
[illegible]	X98-0504-060	0.2 mm
[illegible]	X98-0504-070	0.1 mm

(10)

	A	SIZE
[illegible]	1.2 mm	[illegible]
[illegible]	3.5 mm	(0331)

Numbers (1)~(12)

can be removed after removing 1 - 6
in Sections I.1 and I.5.

(11) (12) can be removed after removing 1 - 6
in Sections I.1, I.4 and I.5.

I. ASSEMBLY and DISASSEMBLY

10. Spool, Sprocket & Shutter Unit Removal

Assembly and Disassembly Notes

1. A special tool is available for removing (10). See the tools list.

Adjustment Notes

1. Winding Shaft (2)
   DO NOT lubricate (2)-2, 3, 4 or the inside of (2)-5. This clutch does not require grease.

2. Be careful not to strip the threads of sprocket spindle (10) when tightening it.

3. Spool Torque
   Standard: 150 - 250 gcm (Spool Diameter : 13mm)

   Adjustment: Change Spool Gear Unit (15) in section I - 9.

Adjustment Tolerances (See parts catalog for adjusting sizes)

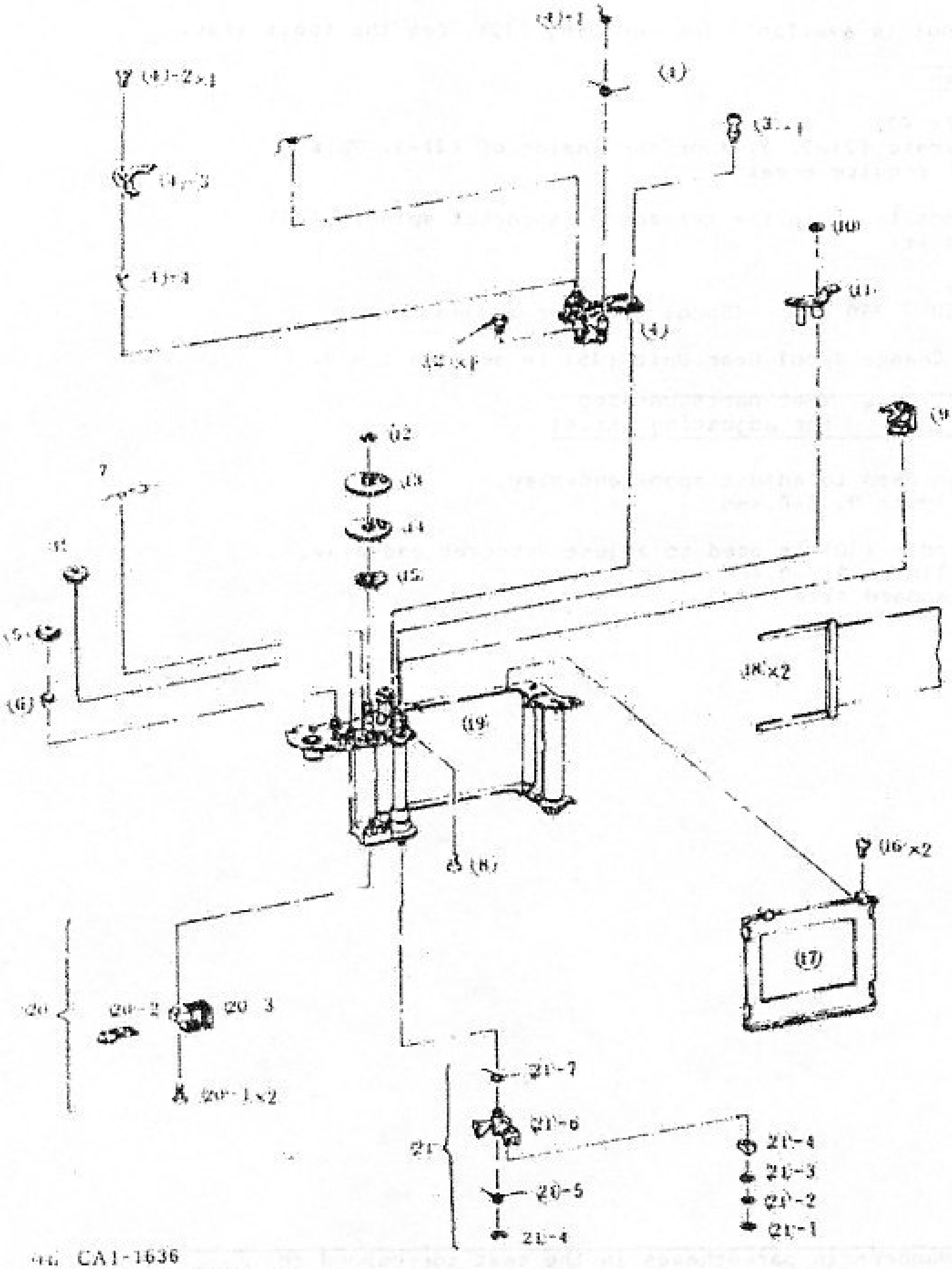
1. Washer (3) is used to adjust spool end-play.
   Tolerance limit: 0.15-0.4mm

2. Sprocket spindle (10) is used to adjust sprocket end-play.
   Tolerance limit: 0.1-0.4mm
   Spindle standard size : 032

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

11. Shutter Unit Disassembly (Part 1)


(1)-1
(1)-2×4
(1)-3
(1)-4
(1)
(3)
(2)×
(4)
(10)
(11)
(9)
(12)
(13)
(14)
(15)
7
8
(5)
(6)
(19)
(18)×2
(8)
(16)×2
(17)
(20)
(20)-2
(20)-3
(20)-1×2
(21)
(21)-7
(21)-6
(20)-5
(21)-4
(21)-4
(21)-3
(21)-2
(21)-1

44 CA1-1636

A	SIZE
9.00 mm	10101
9.15 mm	10201Main

Numbers (1) ~ 20

I. ASSEMBLY and DISASSEMBLY

11. Shutter Unit (Part 1)

Adjustment Notes

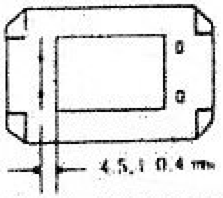
1. Shutter Curtains

Because of the increased use of plastic (pinion gear etc.) the best method for installing shutter curtains is different than older conventional shutters.

1.1. Second Curtain(Order: 1. ribbons , 2. curtain end)

1. Make sure the curtain is parallel with the aperture at both ends and the center and attach the ribbons.
2. Attach the curtain end following the same precautions.
3. Adjust the position of the curtain bar with the pinion gear mesh.
4. After adjustment, stake the pinion gear with Aron-tite.
5. Tension the spring drum.

Adjust the final position of the curtain bar to 4.7 +-0.4 mm from the body aperture edge. Measured on light shield (17), the distance is 4.5 +-0.4mm and there are punch marks at the 4.5 mm position.



1.2. First Curtain (Order: 1. curtain end, 2. ribbons)

1. Check that the curtain bar is parallel with the aperture and the 2nd curtain bar and attach the curtain end.
2. Attach the ribbons, making sure everthing is kept parallel.
3. Adjust the 1st and 2nd curtain overlap with the pinion gear mesh. Overlap should be 1.5 to 3.0 at both edges and the middle of the aperture. (At the end of travel, the overlap 3.5mm).
4. After adjustment, stake the pinion gear with Aron-tite.
5. Tension the spring drum.

2. Second Curtain Magnet
See section II.4.4. for holding power check.

3. SW4 (7)
Use only fronsolve or alcohol type cleaners.
SW4 OFF position: SW4 must turn off just as the master gear starts to turn when the first curtain is released.
Standard: 1st Curtain release must take place at SW4 OFF +- 0.1mm. This adjustment helps insure even exposure.
Reason: The 1st curtain start lever has a governor to slow the start of the 1st curtain release lever.

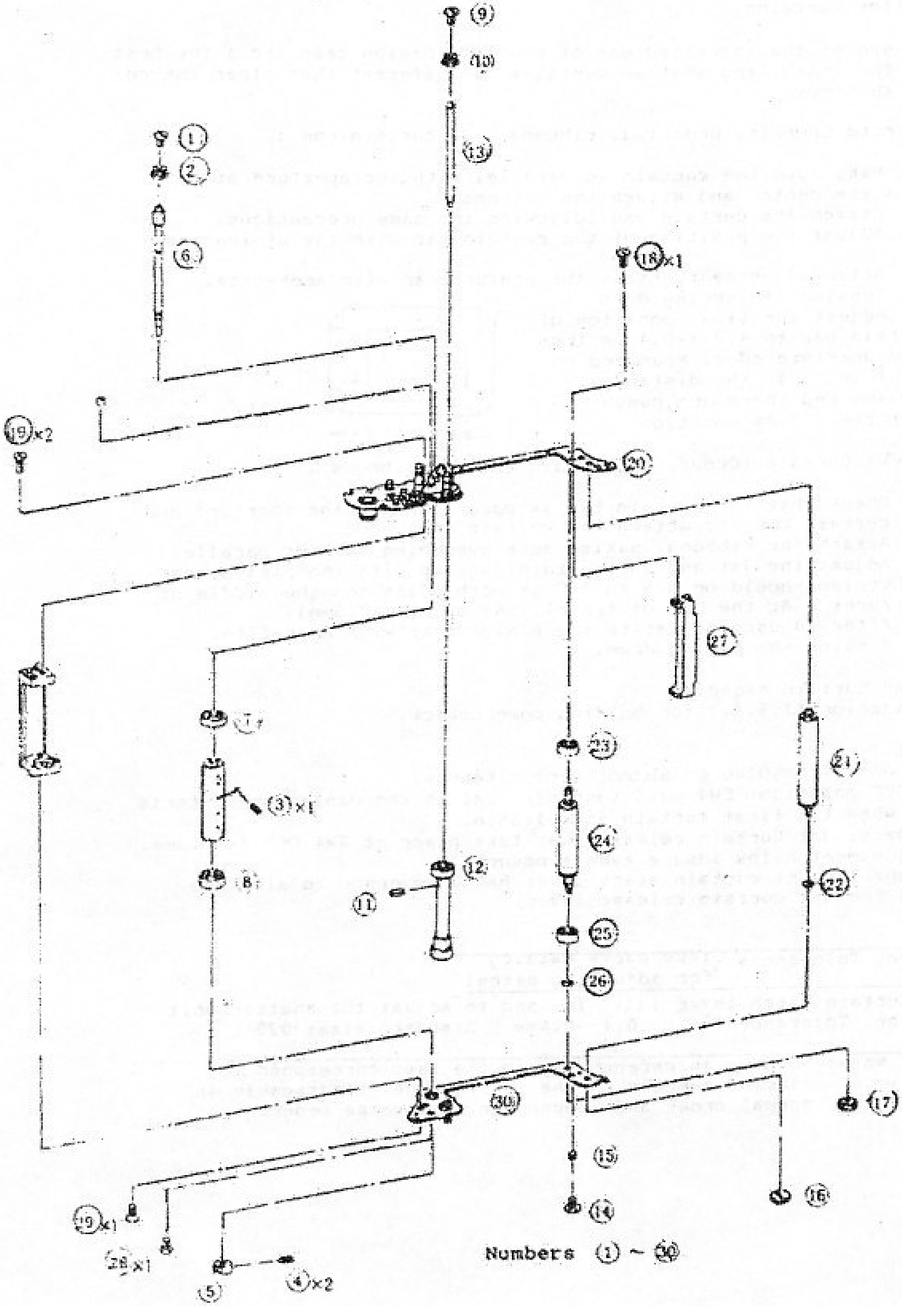
Adjustment Tolerances (See parts catalog for adjusting sizes)

1. 1st Curtain latch lever (11) is used to adjust the shutter unit overcharge. Tolerance limit: 0.4 -0.8mm Standard size: 020

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

I. ASSEMBLY and DISASSEMBLY

12. Shutter Unit Disassembly (Part 2)


⑨
⑩
⑬
①
②
⑥
⑱×1
⑲×2
⑳
㉗
⑦
③×1
⑧
⑪
⑫
㉓
㉔
㉕
㉖
㉑
㉒
㉚
⑰
⑮
⑭
⑯
⑲×1
㉘×1
⑤
④×2

Numbers ① ~ ㉚

Adjustment Notes

1. Curtain latch cam (5) must be adjusted. (See section II.4.1.)

Note: Numbers in parentheses in the text correspond to circled numbers on the facing page. Disassemble in normal order and reassemble in reverse order.

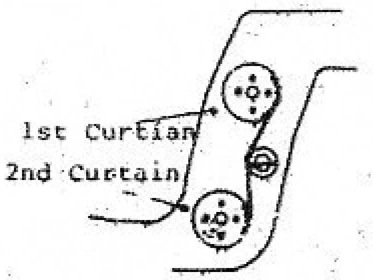
II. ADJUSTMENTS

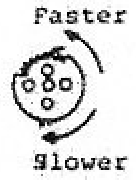
1. Shutter Adjustments

1.1. Curtain Travel Time

1. Tolerance 10.5 +- 0.3 mS (34mm slit separation)

2. Adjustment


1st Curtian
2nd Curtain


Faster
Slower

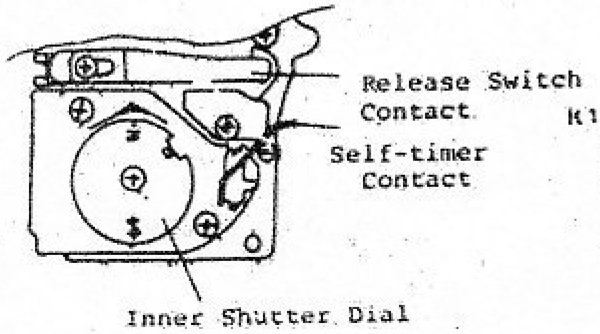
	Teeth	ain Time Change
1st	3	0.1 m Sec
2nd	3	0.15 m Sec

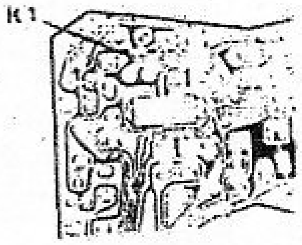
A. Set the shutter speed to 1/1000
B. Check the curtain travel time.
C. Only "normal unevenness" is allowed.
("Normal" unevenness means that the 1st curtain is faster than the 2nd curtain).

1.2. Shutter Speeds

1. Tolerance limit: at 1/1000 : 1.1 mS (0.8 1.4 mS)

2. Adjustment
Set the shutter dial to the manual 1/1000 position. (With the top cover removed, set the "10 to the index as shown below.


Release Switch
Contact
Self-timer
Contact
Inner Shutter Dial



Install a 200 KOhm variable resistor in place of the existing RTC and adjust until the speed is within tolerance with 3V applied. Remove and measure the variable and install the nearest fixed resistor.

(If a variable resistor is not available, change fixed resistors until the correct value is found. A 1 Kohm increase in resistance slows the shutter speed about 0.1mS).

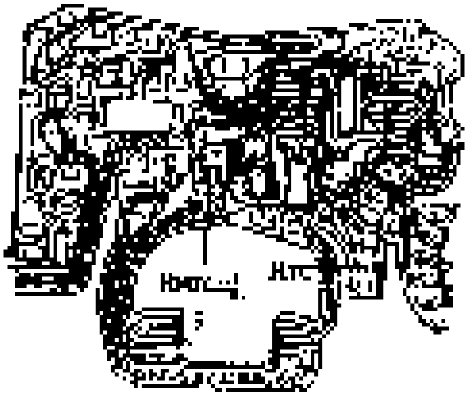
IV. ADJUSTMENTS

4. AE Adjustments

4.1. Offset

(Only necessary if IC 1 is replaced)

1. Desolder one end of resistor RTC.



2. Short pin 12 (MOS IN) to IC1 pin 10 (V2).

3. Measure the voltage from pin 10 (V2) to ground. Record as V1.

4. Measure the voltage from pin 11 (MOS OUT) to ground. Record as V2.

5. If V1 - V2 = 0 to 5mV, adjustment is not necessary. Remove the short and re-coat IC1's pins with Peligon E.

6. If the voltage is not correct proceed with the adjustment.

7. Remove R NULL ADJ resistor connected to either R NULL 1 or R NULL 2 and install a 200 KOhm variable at the R NULL 2 pad.

8. Adjust the variable until V1 and V2 are within limits. Disconnect and measure the variable.

9. Install the nearest possible fixed resistor.

10. Recheck the voltage after installing the new resistor.

11. After the adjustment is finished, remove the short, resolder the RTC resistor and re-coat the IC pins with Peligon E.

4.2. Reference Voltage (Vc)

The reference voltage (Vc) is used as the base for all following AE adjustments. Check it carefully.

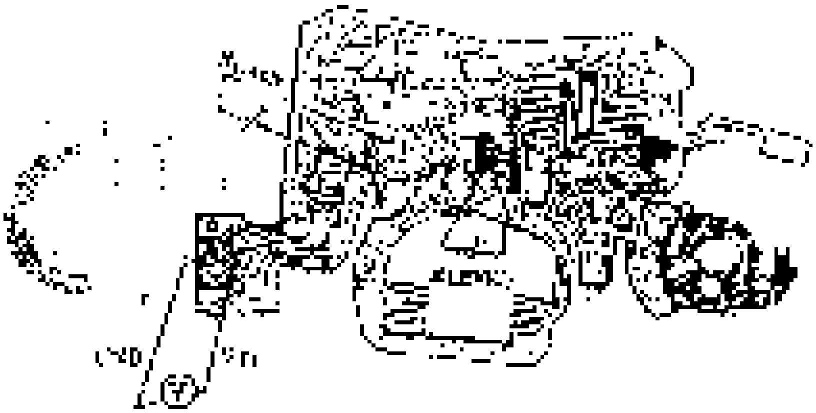
1. Reference Voltage (Vc) : 1.300   30mV

2. Check
   A. Apply 3V power to the camera.

   B. Measure the voltage from Vc to Gnd at IC2 with SW1 on. Record as reference voltage for the following adjustments.

II. ADJUSTMENTS

2. AE Adjustment



2.5. Gain

This adjustment is to correct ΔV (delta AV) change to eliminate variations between the various EV levels.

1. Standard: Difference between EV9 and EV15 ; 6EV +- 0.3V

2. Adjustment

A. Remove R Gain resistor and install a 300 Kohm variable.

B. Adjust the light source to EV 15 ([illegible], 4000 cd)

C. Put the service standard lens (AE evaluation lens if available) on the camera and set the aperture to f/5.6, and the shutter dial to "A". (see the test top cover).

D. Turn SW1 on.

E. Calibrate the correct gain voltage as follows:

$$\frac{Vc}{8} \times 6 = V\ Gain$$

F. Measure the voltage at V TP with a DVM (Vp1).

G. Set the light source to EV9 and repeat the process (Vp2).

H. (Vp1) - (Vp2) = $\frac{Vc}{8}$ × 6 +- 10mV

I. Adjust the variable to meet the above conditions. Disconnect and remove the variable

J. Install the nearest suitable fixed resistor.

5. ADJUSTMENTS

2. AE Adjustments

2.4 Level
Adjust to correspond to AV level.

1. Standard: +-0.1V

2. Adjustment

a. Adjust the light source to EV 12 (F=12.5, 500 mA) and camera and lens as in the previous adjustment.

B. Turn SW 1 on.

C. Calculate the level voltage (TV).

$$TV = \frac{11.7\,Vc}{8}$$

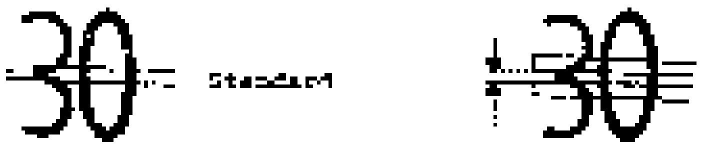
D. Measure the TV voltage at the point shown on the proceeding page. It should be the same as the calculated value.

Note: Unless otherwise noted, all measurements are to body ground. Only marked points should be used because parts of the body are plastic.

E. If the voltage is not correct remove the fixed resistor and use a variable to find the necessary resistance.

2.5. Meter Needle

1. Standard and tolerance limit:



2. Adjustment

a. Adjust the light source to EV 9 (F=13.5, 44 mA) with the service standard lens (AE Regulation lens if available) on the camera and set the aperture to f/4.0, and the shutter dial to "A".

b. Turn SW1 on.

c. Adjust the needle so that it cuts the center of the "3" in "30" on the shutter speed scale.

II. ADJUSTMENTS

2. AE Adjustments

2.6 Meter Deflection Angle

The meter deflection angle is adjusted so that it is within the given tolerance limit at EV15 (1/1000, f/5.6) and EV9 (1/15, f/5.6).

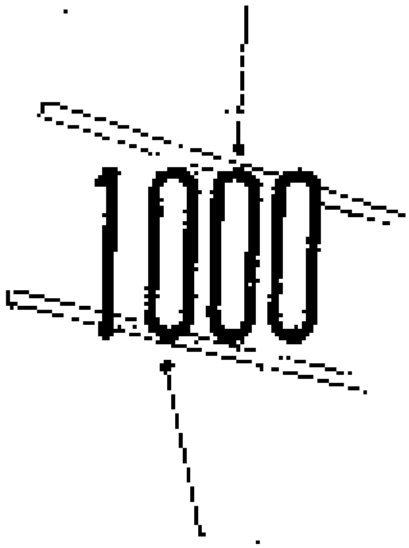
1. Standard:

   EV15: 1/1000 ± 0.5EV

   EV9 : 1/15 ± 0.5EV

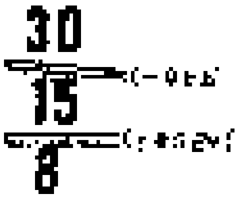
1/1000 Limits

(+0.5EV): Lower edge of needle aligned with inner edge of middle zero).



(-0.5EV): Upper edge of needle aligned with inner edge of first zero).

1/15 Limits



2. Adjustment:

   A. Measure Vc (Section II, 2a, 3.)

   $$\frac{Vc}{4.44} \times 10^{4} - 291 \text{ ohms} = Y \text{ ohms}$$

   B. Select the adjusting resistor closest to the "Y" value and install it in place of the current R4.

   C. Recheck the meter needle position at EV9 and EV15.

II. ADJUSTMENTS

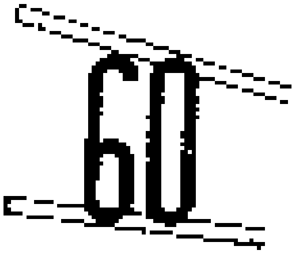
7. AE Adjustments

7.7. Flash Shutter Speed

1. Standards:

A. The Meter needle should align at 1/60 +- 0.4EV when the camera is in the electronic flash mode.

-0.4EV limit: Needle aligned with upper edge of zero.

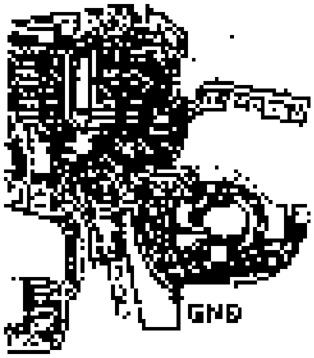


+0.4EV limit: Needle aligned with lower edge of six.

B. Timing (Shutter tester)

A Range: 0.5 mS or over

B Line: 3.5 mS or less



2. Check and adjustment

A. Set the shutter dial to 1/60

B. Ground the CCC pad of the circuit. The needle should point to 1/60.

C. If it does not, recheck the previous meter adjustments.

D. Adjust the timing by changing X contact spacing.

7.8. Battery Checker

1. Standard: High Z +- 0.1V input, the needle should be centered on the "B" in "BATT". (See drawing in "Meter Needle Adjustment".)

---

2. Adjustment

A. Connect the regulated low voltage power supply (LVPS) to the camera and set it to minimum output.

B. While pushing the checker button, gradually increase the voltage until the needle bisects the "3" in "30".

C. Read the voltage.
If it is greater than 2.1V, install the next lower RCH.
If it is less than 1.9V, install the next higher RCH.

D. Recheck meter deflection at EV13 and EV9.
If it fails to reach +0.5EV limit, install the next larger RM.
If it exceeds the +0.5EV limit, install the next smaller RM.

E. Recheck the battery checker.

7-3. Current Consumption

1. Leak current

A. Standard: Under 10 uA

B. Check
Connect the LVPS to the camera and read the meter.

2. Operational Current

A. Standard: Under 250mA

B. Check

1. Connect the LVPS and an ammeter to the camera.

2. Focus on the test chart so the green LED is lit (50/1.4).

3. Read the ammeter.

4. Set the shutter dial at "B" and wind the shutter.

5. Press and hold the shutter button.

6. Read the ammeter.

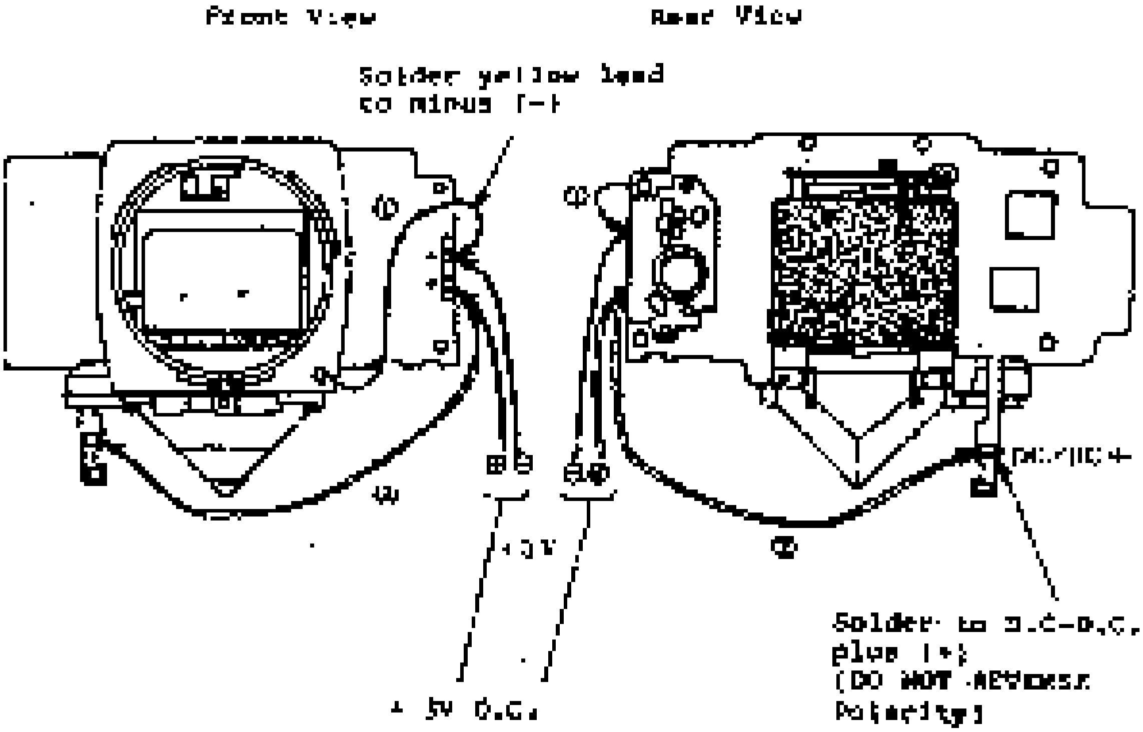
3. QF Adjustments

3.1 Preparations for Electronic Focus (QF) Adjustments

1. Camera Setting

(All electronic focus adjustments are made to the front panel unit attached to the QF Test Adaptor (CY9-2050-000). The front panel mounts in the adaptor upside-down.

1.1


Front View
Rear View
Solder yellow lead to minus (-)
+3V
+ 3V D.C.
DC/DC+
Solder to D.C-D.C. plus (+) (DO NOT REVERSE Polarity)

Connect the yellow lead to minus (-) and the orange cord from the plus (+) to the plus (+) contact on the tounge which connects to the AE flex. Connect +3VDC to the front panel connection.

> **CAUTION:**
> Do not reverse polarity. If power is applied with the plus and minus leads reversed, the D.C.-D.C. converter capacitor will explode. Always check polarity before applying power.

1.2. Cover the film aperture with black plastic foam, and make a black flap to cover the entire rear of the front panel.

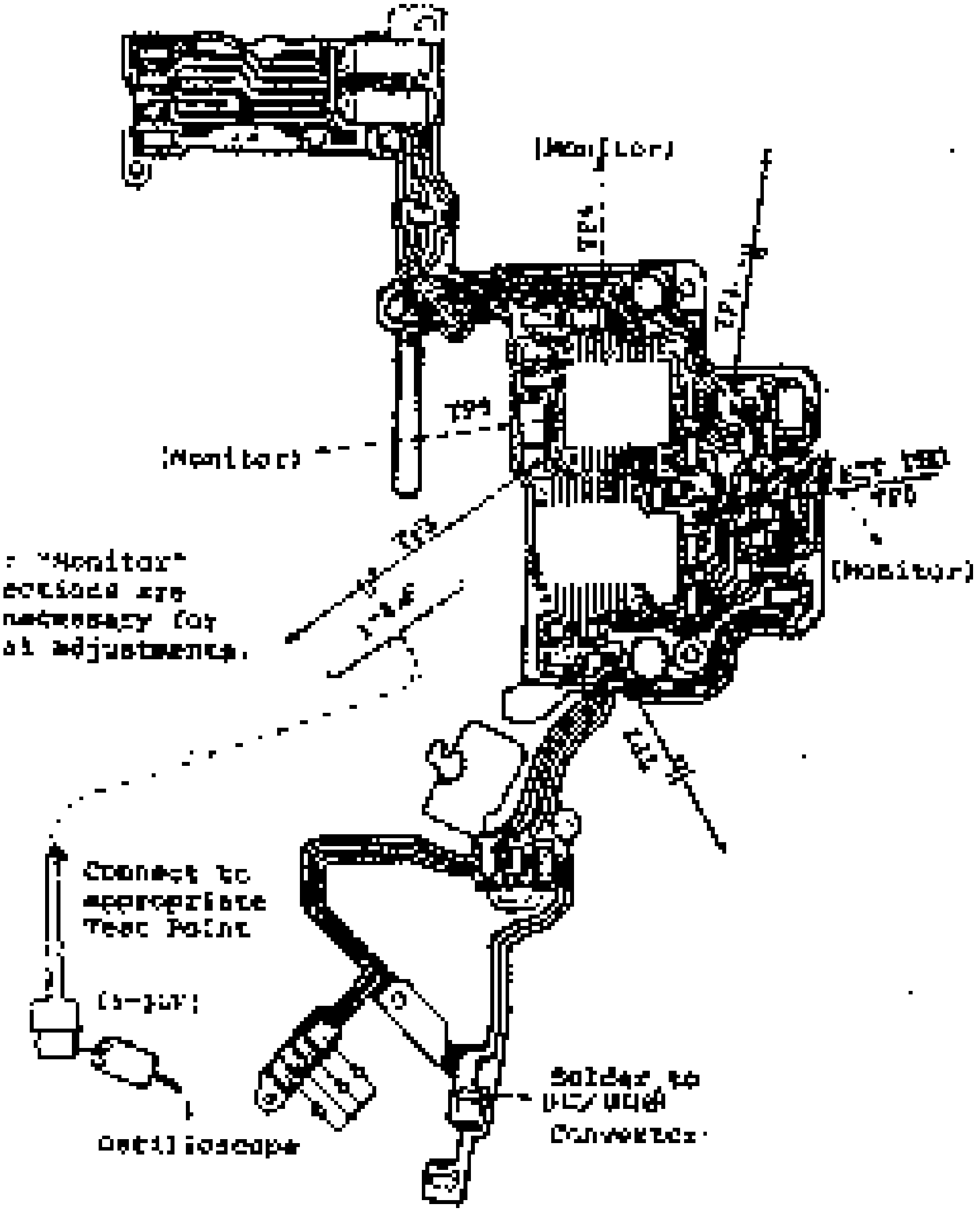
1. OP Adjustments

1.3. Oscilloscope Connections

It is advisable to solder leads to the IF (focusing) flex prior to making adjustments.

Oscilloscope :
Trigger: External – Connect to TPD
Probe : 1:1 with 1 to 3 µF capacitor*

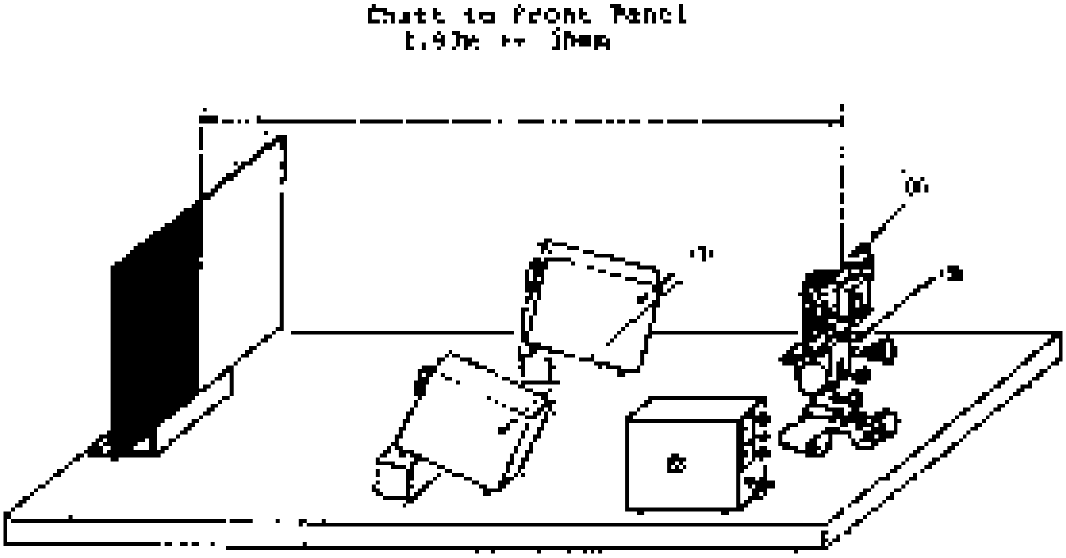
*To see the signals at TP1, 2, and 3 a coupling capacitor (1 to 3 µF) is necessary. Because of the capacitor, it is necessary to wait 10 sec. to 1 minute (Discharge time).


(Monitor)
TP4
TP5
TP1
(Monitor)
TPD
(Monitor)
TP3
TP2
Note: "Monitor" connections are not necessary for normal adjustments.
Connect to appropriate Test Point
(1-3µF)
Oscilloscope
Solder to FE/UHF Converter

1-A. Test Setups

There are two possible test set-ups possible to adjust the QF mechanism, one using test charts at a finite distance and one using a collimator with charts optically at infinity.

1. Finite Distance Setup



A. Light Sources (1)
Light source(s) which can provide a constant, consistent, illumination over over the central 20cm of the chart is necessary. We have found that modified 35mm manual slide projectors are best, and that two projectors give much more even illumination than a single unit. If a single unit is used, it should be located as close as possible to the optical axis as possible to avoid uneven illumination.

A.C. flicker makes adjustment very difficult. Each projector should be modified to take a D.C. 12V. 24W bulb. The fan should be remain connected to the A.C. power supply.

B. D.C. Power Supply (2)
Use a power supply capability of powering the light source lamp(s).

C. After making the connections, mount the front panel to the QF Adjustment Stand (CY9-1050-000). (4)

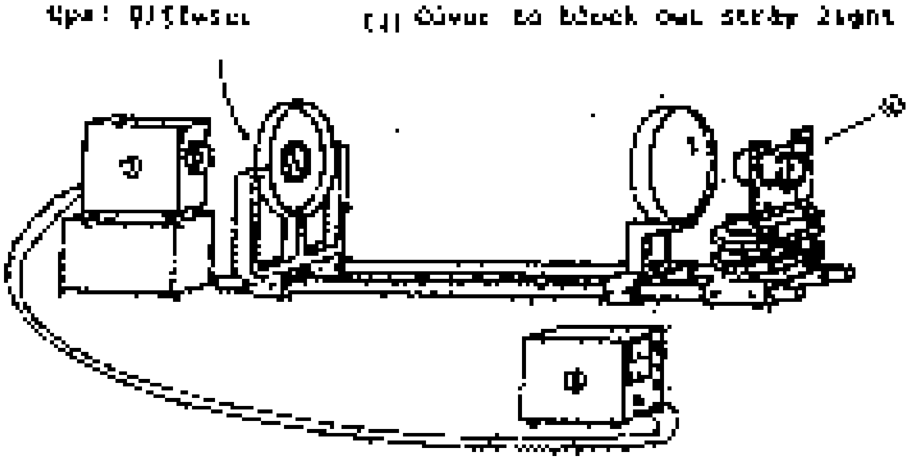
D. Tripod Pan Head (5)
A large, smooth tripod pan head is recommended, if not available, a stand which allows small angular movements is recommended.

II. ADJUSTMENTS

1. QF Adjustments

[illegible]

2. Oscilloscope Set-up



A. Modified Projector (1)
Use modified projector as explained in finite distance set-up.

Place a diffuser between projector lamp and collimator chart.

Light the chart evenly with an illumination of about EV8.

B. D.C. Power Supply (2)
Use a power supply capability of powering the light source lamp(3).

C. After making the connections, mount the front panel in the QF Adjustment Stand (CY9-1044-000). (4)

D. Tripod Pan Head
A large, smooth tripod pan head is recommended. If not available, a stand which allows small angular movements is recommended.

E. Chart
The chart should be adjusted to infinity position.

II. ADJUSTMENTS

3. AF Adjustments

3.2 AF Test Standard Lens

1. Lens extension

   To accurately measure the lens extension, a piece of graph paper should be taped around the lens on the focusing scale. Since the front panel is upside-down, the most convenient position is not at the normal index, so a new index is also desirable.

   NEW FD 50mm 1:1.4

   The lens extension for one complete revolution is 12.5mm or 0.03472mm per degree. This is equivalent to 0.0648mm lens extension per millimeter of revolution on the circumference of the focusing ring with 0.2mm thickness graph paper.

   FD 50mm f/1.4

   The lens extension for one complete revolution is 12.7mm or 0.0353mm per degree. This is equivalent to 0.0559mm lens extension per millimeter of revolution on the circumference of the focusing ring with 0.2mm thickness graph paper.

2. Finite Distance (2 Meter) Lens Extension

   It is necessary to establish the exact position for correct focus at 2 meters on the test standard lens if the finite distance method is used.

   The calculated extension for 2 meter focus is 1.29mm, but because of variations between individual lenses, the following procedure is recommended.

   A. Select a known-good camera body (an average of several is better), and remove the front panel.
   B. Select a 50mm/1.4 lens that is accurately adjusted for infinity focus.
   C. Prepare the front panel and lens as outlined in section (II.3.1).
   D. Adjust the lens so that VA1 ≒ VA2 at TP5. Mark the extension of the lens at this point. This is the "just focus"* correct 2 meter point for the test standard lens.

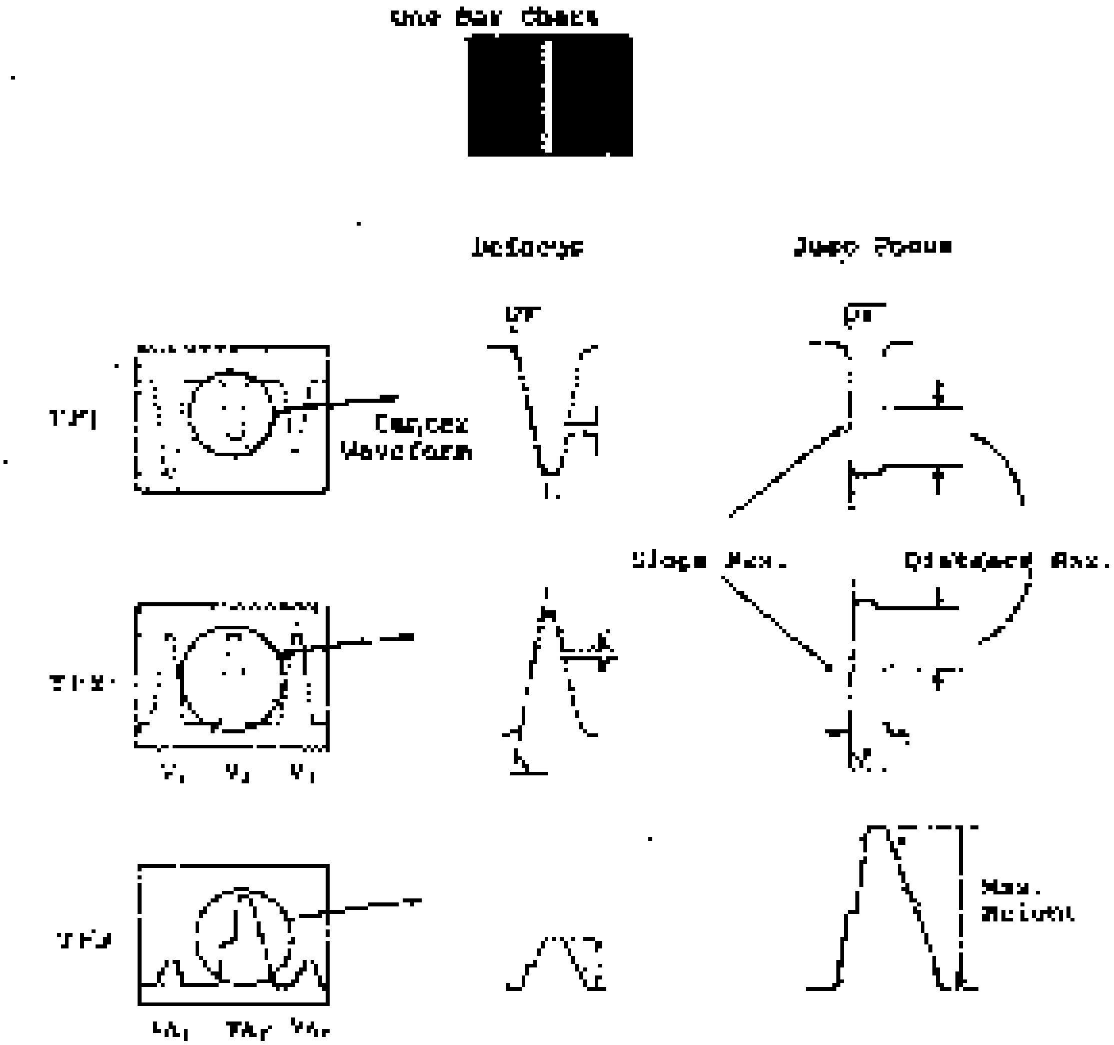
   * Just Focus: For lack of a better term, the Japanese term "just focus" will be used to indicate the correct "in focus" signal or condition of the AF circuit.

II. ADJUSTMENTS

1. RF Adjustments

1.3 Typical Oscilloscope Waveform

Throughout this guide references are made to adjust front, middle or rear focus. The oscilloscope waveform for best middle (just focus) are shown below. For front focus, the waveforms on the left would be as shown and for rear focus the waveforms on the right would be as shown.


One Bar Chart
Defocus
Just Focus
TP1
Center Waveform
TP2
V1
V2
V1
TP3
Slope Max.
Distance Max.
Max. Height

11. [illegible]

1. [illegible] Adjustments

1.4. Post IC Replacement Adjustment Task List

When any of the IC's are changed, perform the adjustments in the order listed.

Replaced IC

Adjustment	CCD	SFP	CPU
1. Mirror Angle 45°	1	1	1
2. Parallax	2	X*	X
3. Level	3	2	X
4. Sensor Parallax	4	4	X
5. Waveform Check	5	5	3
6. QE Focus (Coarse)	6	6	X
7. QE Focus (Fine)	7	7	4
8. [illegible]	8	8	7

*1 : Adjustments marked "X" are not necessary.

5.2. Sub-mirror Adjustment

Tools: 1. Universal 90° Collimator
  or 2. Simplified 90° Collimator
      3. Reverse Mount
      4. Spanner

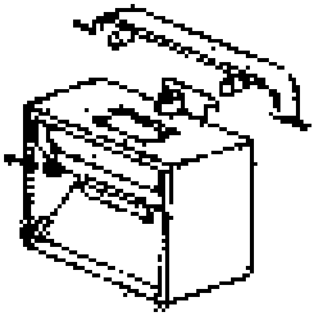
Standard:

Sub-mirror : Horizontal +-8'
             Vertical   +-6'

Main Mirror: Horizontal +- 10'
             Vertically +- 3'

Adjustment : Sub-mirror eccentric

Method:
Adjust eccentric until within mirror angle is within tolerances.

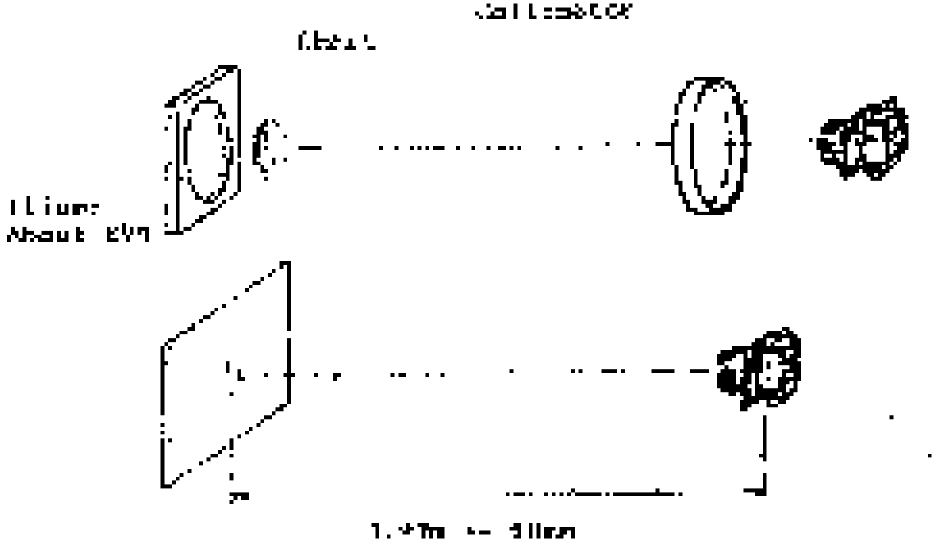


II. ADJUSTMENT:

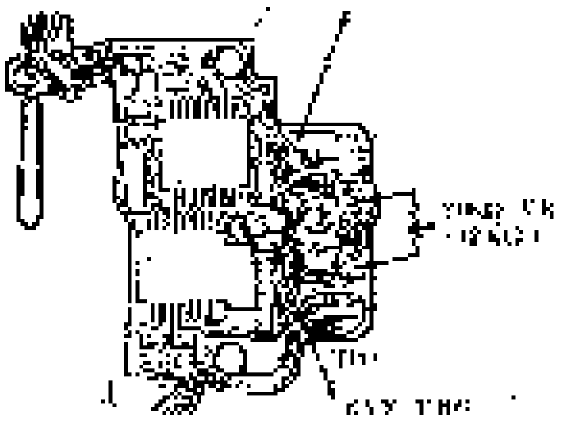
4. AF Adjustments

4-1. CCD Position Adjustment

1. Set up


Collimator
Chart
Illumi-
About EV?
1.4m ~ 5mm

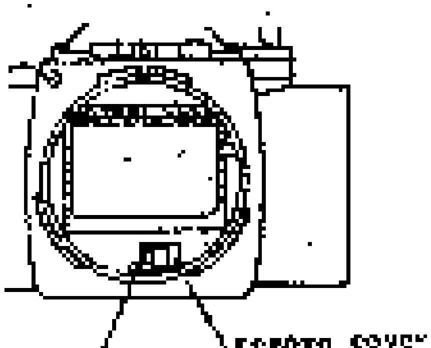
2. Oscilloscope Coupling and Adjustment



Adjustment
(with mirr. diaphragm
unit removed)

Oscilloscope
Coupling : D.C.
Channel 1: 50mV/div (1:1 probe)
Time Base: 2mS/div.
Trigger: External (leading edge)

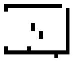
Because of capacitance coupling, wait about 30 seconds for D.C. level to stabilize.


Sensor Positioning Screw
Sensor cover plate

3.5 Parallax Adjustment

Test Equipment: Oscilloscope

Tools: 1. AF Test Standard Lens

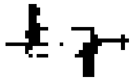
2.  Chart

3. 20 KOhm Variable Resistor (set to about 17 KOhm)
4. 1 - 5 uF film or Tantalum capacitor (on probe)

Adjustment : CCD Longitudinal Position

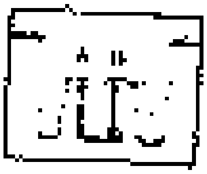
Method:

1. Loosen the CCD positioning screw (previous page)
2. If the AF flex is new there will be no resistors mounted at the R104, 105 and 106 positions. In this case mount the 20 KOhm variable in the R103 position. (At least one of the three must be installed to make this adjustment). Pre-set the variable to about 17 KOhm .
3. Adjust the front panel position so the chart is aligned with the focus mark as shown.



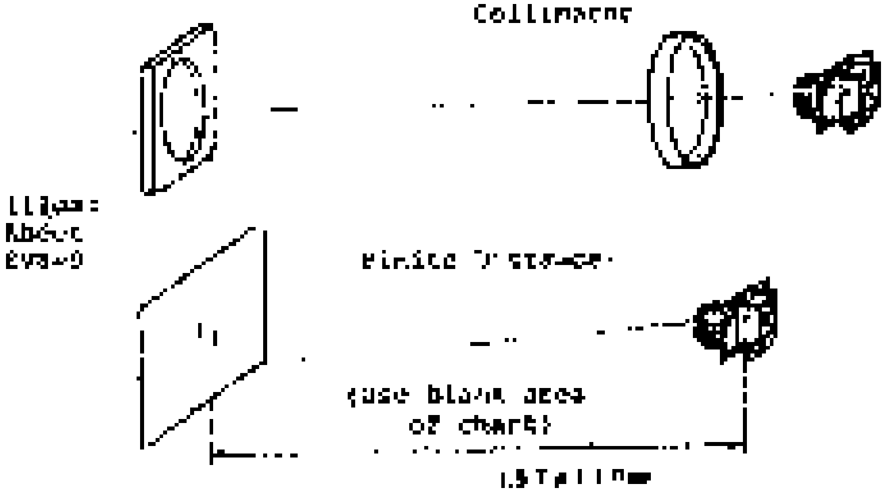
Chart/Mark Alignment

4. Adjust for best middle (just focus) focus (See section 6.3.1.3). Loosen three sensor screws and adjust the longitudinal (fore-aft) position of the sensor
5. Adjust so that, in the oscilloscope waveform A = B and tighten the screws.
6. Remove the lens and tighten the sensor positioning screw until it just touches the sensor unit.
7. Leave the 20 KOhm resistor in position. It is used in the next adjustment.

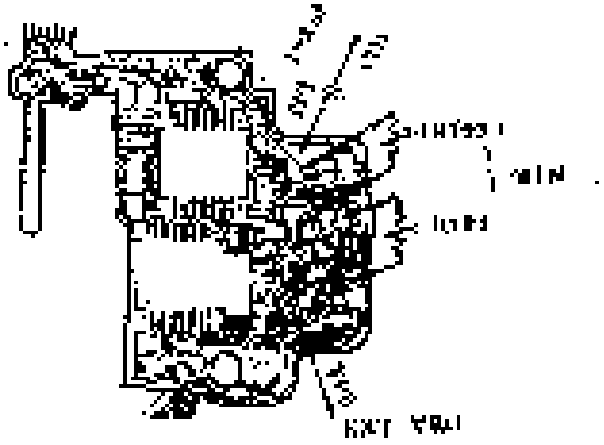


3.4. Gain Adjustment

1. Set-up

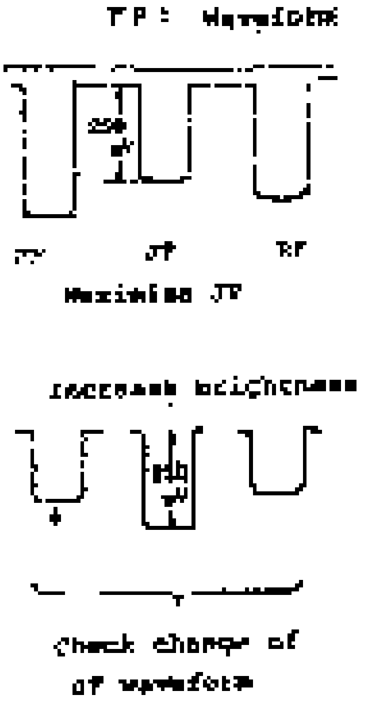

Collimator
Light: About EV=9
Finite Distance
(use blank area of chart)
1.5 to 1.0m

2. Oscilloscope Coupling and Adjustment



Oscilloscope
Coupling : D.C.
Channel 1: 50mV/div (1:1 probe)
Time Base: 1ms/div.
Trigger: EXTernal(trailing edge)

> Because of capacitance coupling, wait about 15 seconds for D.C. level to stabilize.


TP : Waveform
250 mV
JF
RF
Maximize JF
Increase brightness
Check change of
of waveform

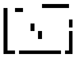
II. ADJUSTMENTS

1. OP Adjustments

[illegible]

1. Adjustment

Test Equipment: Oscilloscope

Tools: 1. CD Test Standard Lens
2. 20 KOhm Variable Resistor (set to about 12 KOhm)
3. 1 - 3 μF film or Tantalum capacitor (on probe)
4.  Short.

Standards:

TP1 Output: 250mV +-10mV

Adjustment : R102 or R103 (minimum)

Method:

1. Mount a 20 KOhm variable resistor adjusted to about 12 KOhm in the R102 position.
2. Watching the waveform at TP1 adjust the variable for a minimum.
   (Normally, the middle waveform will be the smallest of the three. If the rear waveform is smaller move the variable resistor to the R103 position and proceed. (There should not be a resistor in both positions)).
3. Set the illuminator for about 2V and adjust the gain at TP1 is 250mV. Then adjust the variable until TP1 decreases suddenly and sharply. (AGC Threshold)
4. At this point gradually raise the illumination level and adjust the variable so the output at TP1 is 250mV +-10mV.

If TP1 is greater than 250mV- Increase Resistance If TP1 is smaller than 250mV- Decrease Resistance

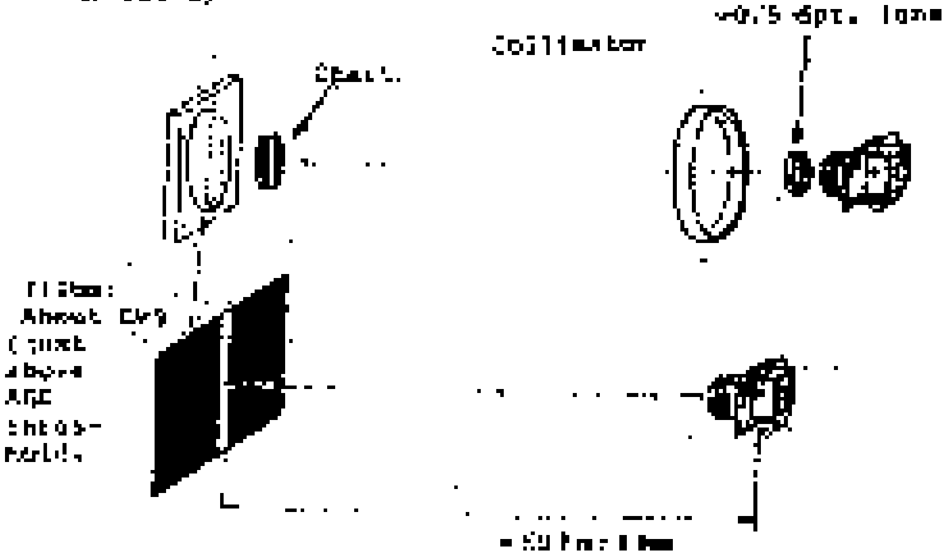
5. Install a fixed resistor of the same resistance as the variable resistor.

15. ADJUSTMENTS

1. AF Adjustments

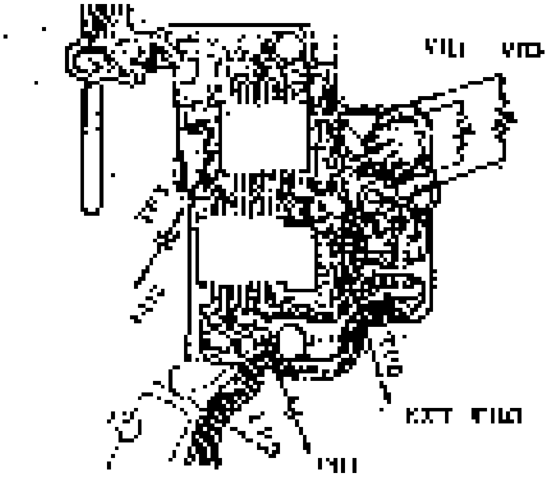
1-1. Sensor Balance Adjustment

1. Setup



+0.75 dpt. lens
Collimator
Chart
Filter: About EV9 (just above AF threshold)
≈ 50 from film

2. Oscilloscope Coupling and Adjustment



VIL
VRD
EXT TRG
CH1

Oscilloscope
  Coupling : D.C.
  Channel 1: 100mV/div (1:1 probe)
  Channel 2: 10-20mV/div
  Time Base: 2ms/div.
  Trigger: External (trailing edge)

Because of capacitance coupling, wait about 30 seconds for D.C. level to stabilize.

II. ADJUSTMENTS

3. QP Adjustments

---

1. Adjustment

Test Equipment: Oscilloscope

Tools: 1. QP Test Standard Lens

2. [redacted] Chart

3. Two each 20 KOhm Variable Resistor (set to about 10 KOhm)
4. 1 - 3 uF film or Tantalum capacitor (on SK900)

Standard:

Comparative height of front, middle, and rear waveform

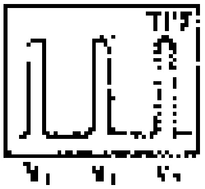
Front and Rear waves should be within 2% of the height of the middle waveform.

Adjustment : R101 , R103 (or R101, R102)
(Depends on section 2.4)

Method:
This method is written assuming the resistor selected in section 2.4 was R102. If it was R103, substitute R103 for R102.

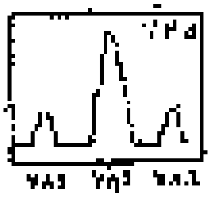
1. Mount a 20 KOhm variable resistors adjusted to about 10 KOhm in the R101 and R103 positions.

2. Check the waveform of TP2 on Channel 1, adjust for "just focus" and record the middle waveform voltage as V2.



3. Adjust for best front focus and adjust the variable resistor so that V1 = V2. Repeat the process for rear focus. (Coarse adjustment ok)

4. Monitoring TP3 on Channel 2, carefully adjust the lens until the VA2 signal is maximum. (If an A.C. light source is used, this adjustment is practically impossible because of instability of the waveform).



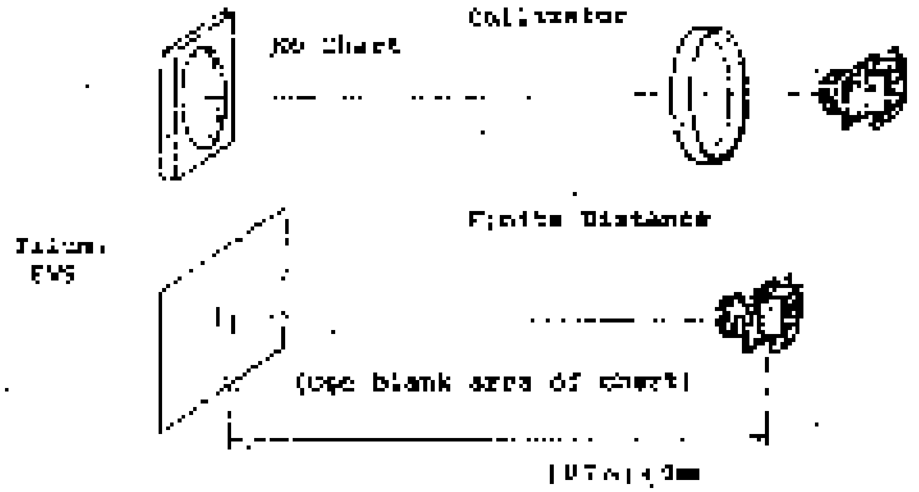
5. Adjust the illumination just above the AGC threshold (where VA2 changes suddenly). Then adjust the oscilloscope variable gain control so VA2 is about seven divisions on the screen.

6. As in step 3 , adjust for best front focus and adjust VR1 so VA1 = VA2. Adjust for best rear focus and repeat using VR3 until VA3 = VA2.

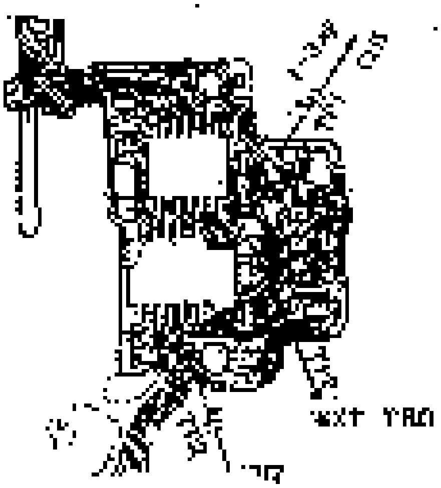
7. Remove and measure the variable resistors and replace them with fixed resistors of the same value.

3.6. Waveform Checks

1. Set-up


Collimator
AF Chart
Finite Distance
Filter:
EVS
(Use blank area of chart)
1070±3mm

2. Oscilloscope Coupling and Adjustment



Oscilloscope
  Coupling : D.C.
  Channel 1: 50mV/div (1:1 probe)
  Channel 2: 0.1~0.2mV/div
  Time Base: 2ms/div.
  Trigger: External(falling edge)

Because of capacitance coupling, wait about 30 seconds for D.C. level to stabilize.

55. ADJUSTMENTS

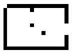
1. OF Adjustments

---

3. Adjustment

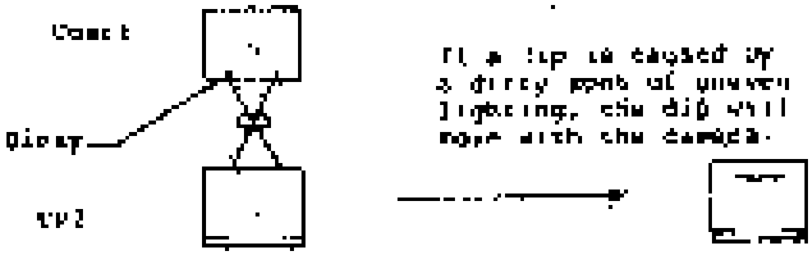
Test Equipment: Oscilloscope

Tools: 1. OF Test Standard Lens

2.  Chart

3. 1 - 2 uF film or Tantalum capacitor (on probe)

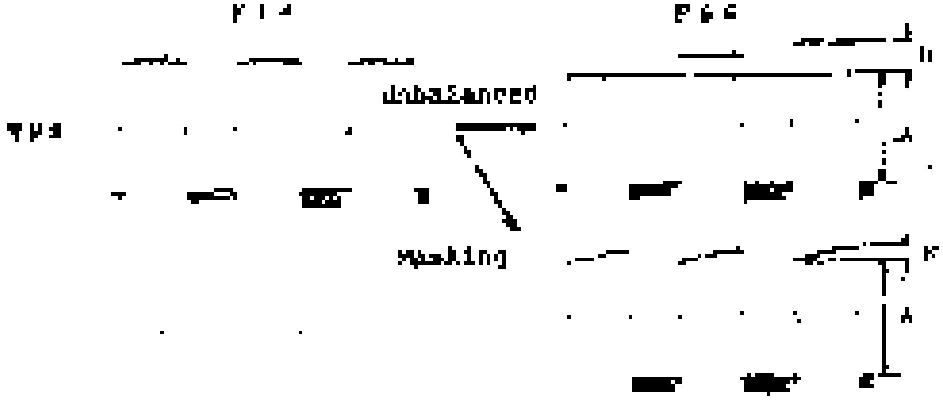
Note: If light from any source other than through the lens strikes the CCD, the balance will appear to be bad. Also, if the chart is not evenly lit or is dirty, the CCD output will appear uneven. In either case the following checks will not be accurate.



If a dip is caused by a dirty spot of uneven lighting, the dip will move with the camera.

4. Masking Check (TP 2 Signal)

Standard: When the lens is stopped down from f/1.4 to f/5.6 the balance should change no more than 7%.

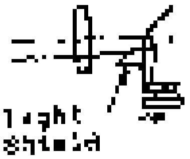


11. ADJUSTMENTS

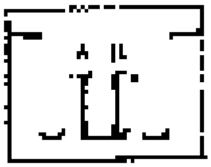
1. AF Adjustments

If masking occures which is very rare, proceed as follows:

A. The main mirror light shield may cause masking. If it does, move the CCD slightly to the rear, and tighten.

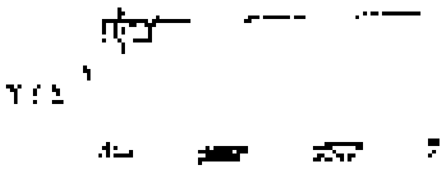


B. With the same set-up as used in 11.1.3 (parallax), move the camera vertically so A=B. At this point the focus frame should be centered on the chart.



2. Dirt, Dust and Foreign Matter Checks

a. Sharp dips in the signal waveform:



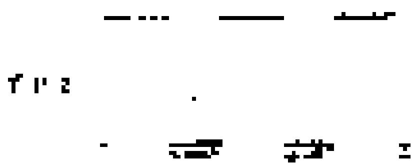
Causes:
1. Foreign matter between beam splitter and CCD.

2. Foreign matter in the CCD.

1. Loosen the two screws and remove the particles.

2. For bad cases over 7% (B/A level), replace the CCD.

b. Shallower, wider dips



Causes:
1. Dirty IR filter

2. Foreign matter between IR filter and beam splitter.

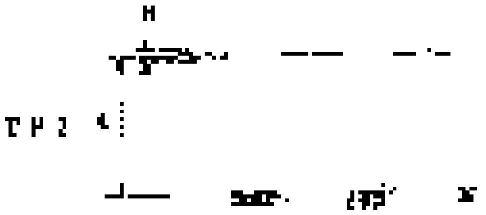
1. Clean the IR filter from within the mirror box.

2. Change the beam splitter base.

8. ADJUSTMENTS

3. OP Adjustments

3. E/O Output Level Imbalance



Cause: Inherent Imbalance between bits, not caused by foreign matter

Tolerance Limits: H/L 30%

There is no cure for this problem. If the O/P is out of tolerance, change it.

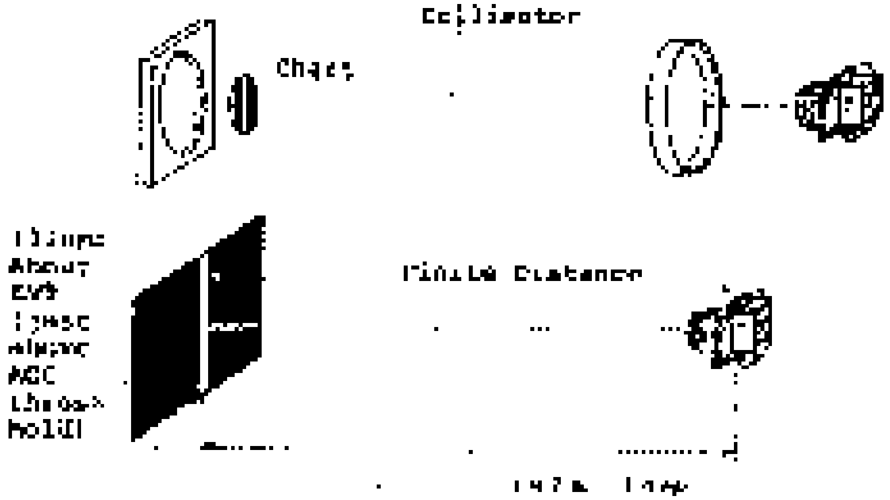
Note: These types of problems do not have much effect on large aperture lenses, but can cause false signals with small aperture lenses.

II. AF Circuits

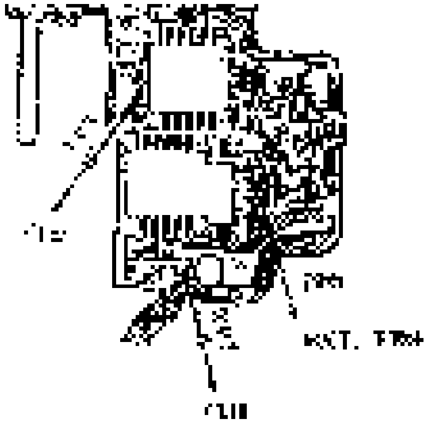
1. AF Adjustments

1.2. AF Focus Coarse Adjustment

1. Set-up


Collimator
Chart
Image About EV9 Light above ACC through hold
Finite Distance
1.5 m Lamp

2. Oscilloscope Coupling and Adjustment


TP
TP6
EXT. TRG
CH1

Oscilloscope
Coupling : D.C.
Channel 1: 100mV/div (1:1 probe)
Channel 2: 10-20mV/div
Time Base: 2ms/div.
Trigger: Ext(neg)(trailing edge)

> Because of capacitance coupling, wait about 10 seconds for D.C. level to stabilize.

NEW FD 50mm 1:1.4
The lens extension for one complete revolution is 12.5mm or 0.03472mm per degree. This is equivalent to 0.0[illegible]mm lens extension per millimeter of revolution on the circumference of the focusing ring with 0.2mm thickness graph paper.

FD 50mm 1:1.4
The lens extension for one complete revolution is 12.0mm or 0.0[illegible]mm per degree. This is equivalent to 0.0190mm lens extension per millimeter of revolution on the circumference of the focusing ring with 0.2mm thickness graph paper.

II. ADJUSTMENTS

1. AF Adjustments

---

3. Adjustment

Test Equipment: Oscilloscope

Tools: 1. AF Test Standard Lens(with graph paper scale).
(See section II-3-1.2).

2. [redacted] Chart

3. 1 - 5 uF film or Tantalum capacitor (on probe)

Standard:

0±0.05mm

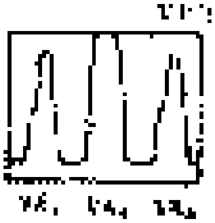
Adjustment : Adjusting washers
(See Parts Catalog for available thickness)

Method:

A. Collimator Method

1. Check the waveform of TP1 on Channel 2. Carefully adjust for "just focus" so that VA1 = VA3.

   Note- Adjust the oscilloscope until VA1 and VA3 are approximately 6 to 7 divisions on the scale. VA2 may be off scale. This is OK.



2. Carefully measure the lens extension from infinity and select a washer to bring the focus to within 0.05mm.

3. Loosen the three sensor mounting screws, install the washer and retighten the screws while pressing the sensor toward the lens mount.

B. Finite Distance Method

1. Same as A-1 above.

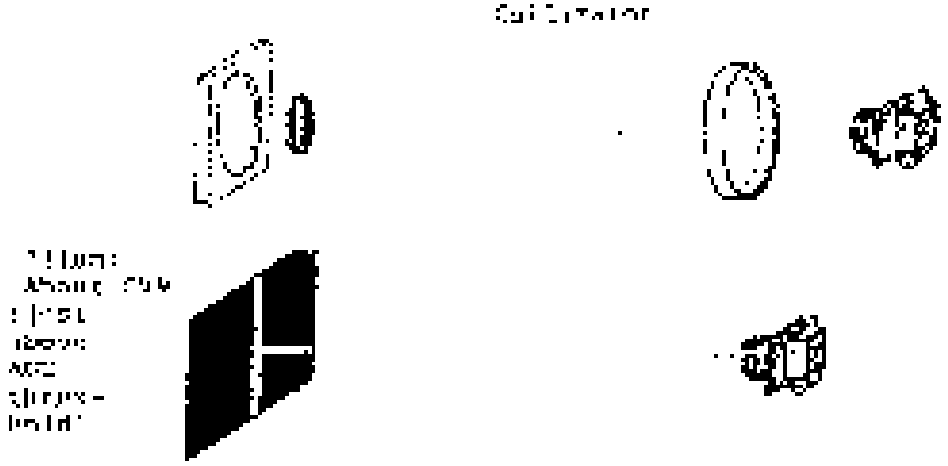
2. Carefully measure the lens variation from 3 meters and select a washer to bring the focus to within 0.05mm.

3. Loosen the three sensor mounting screws, install the washer and retighten the screws while pressing the sensor toward the lens mount.

1. OP Adjustment

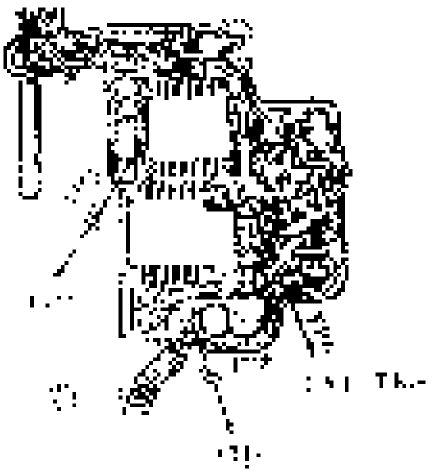
1-1. OP Focus Bias Adjustment

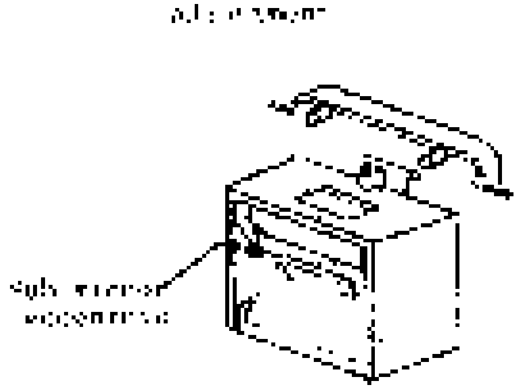
1. Setup


Collimator
Filter:
About 50%
[illegible]
[illegible]
ND
[illegible]
[illegible]

[illegible]

2. Oscilloscope Connection and Adjustment




Adjustment
Sub mirror
adjustment

Oscilloscope
Coupling : DC.
Channel 1: 100mV/div (X1 probe)
Channel 2: 10-20mV/div
Time Base: 2ms/div.
Trigger: External (tracking servo)

(*Signals for adjustment
coupling with [illegible]
[illegible]
[illegible])

---

1. Adjustment

Test Equipment: Oscilloscope

Tools: 1. QF Test Standard Lens (wire graph paper scale)
(See section [illegible]).

2. [redacted] Lens

3. [illegible] of [illegible] or [illegible] capacitor (on board)

Standard:
0 -- 0.02mm (at infinity for collimator method)
(at 2m for finite distance method)

Adjustment

Sub-mirror eccentric

Method:

A. Collimator Method

Set the lens to infinity. Check the
waveform of VA2 on Channel 2.
Carefully adjust the sub mirror
eccentric so that VA2 = VA3 exactly.

B. Finite Distance Method

1. Set the lens to 2m. (See Note 1), and carefully adjust the sub mirror so that VA2 = VA3.

2. Sight on a distant, high contrast scene with the lens at infinity. Slowly move the lens off of infinity until the green [illegible] focus indicator goes out. The infinity mark should be aligned with the f/4 - f/5.6 area of the depth-of-field scale.

Caution: The QF lens focus adjustment cannot be performed
unless these pre-conditions are met.

1. The Sub-Mirror is adjusted to 45° +- 6'.
2. The focus has been adjusted with a camera (3.6.)
to within 0.05mm.

If these conditions are not met, the lens adjustment
will cause focusing errors.

Note 1. See Section [illegible].

III. ADJUSTMENTS

1. AF [illegible]

3-4. [illegible] adjustment

1. Set up

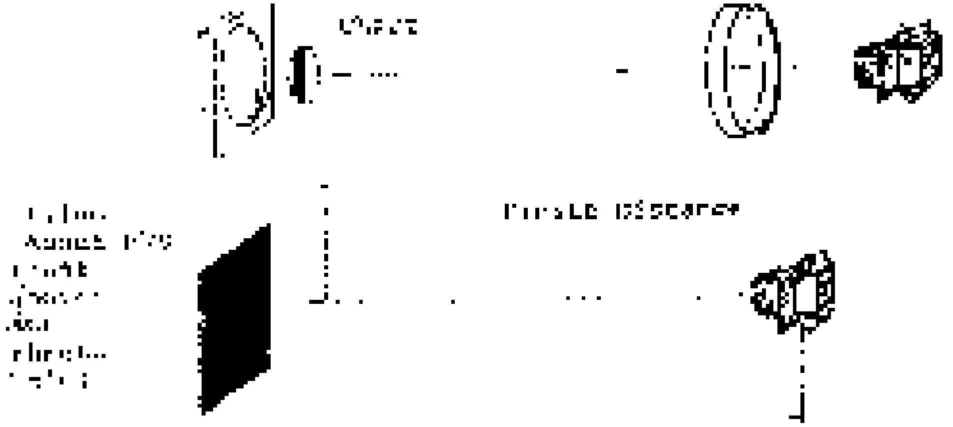
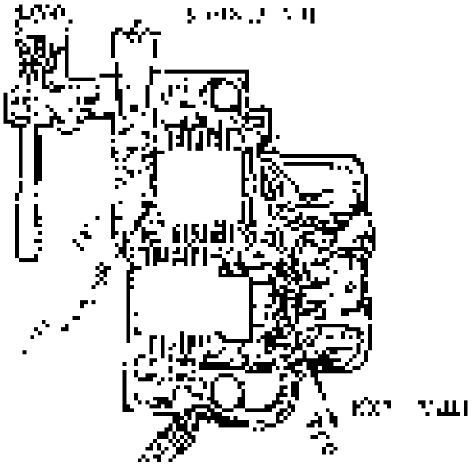


Fig. [illegible]

2. [illegible] Connection and Adjustment



Oscilloscope
Coupling : D.C.
Channel 1: 50mV/div (1:1 probe)
Time Base: 0.5ms/div.(Delay)
Trigger: External(falling edge)

(If oscilloscope does not have delay, use 5ms/div. and 10X magnifications.)

Because of capacitance coupling, wait about 15 seconds for D.C. level to stabilize.

II. ADJUSTMENTS

1. OF Adjustments

---

1. Adjustment

Test Equipment: Oscilloscope

Tools: 1. OF Test Standard Lens with graph-paper scale, (See section III.1.3).

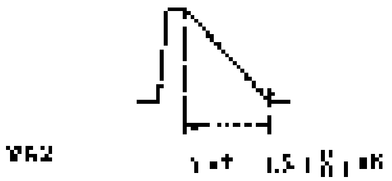
2. Chart

3. 500 KOhm Variable Resistor (set to 500 KOhm)
4. 1 µF or tantalum capacitor (on probe).

Standard:

Above AGC Threshold + 01 (use ...):

VAT = 1.5 ms $^{+0}_{-0.05}$ ms



VAT IF waveform

Method:

1. Above balance adjustment must have been completed. Remove R205 and install the 500 KOhm variable resistor in its place.

2. Adjust for peak focus condition (VA maximum), increase the brightness past to the AGC threshold and read VAT at this point. Adjust the variable resistor until VAT is correct.

| Higher resistance = Longer VAT
| Lower resistance = Shorter VAT

3. Remove the variable resistor and replace it with a fixed resistor of the same value.

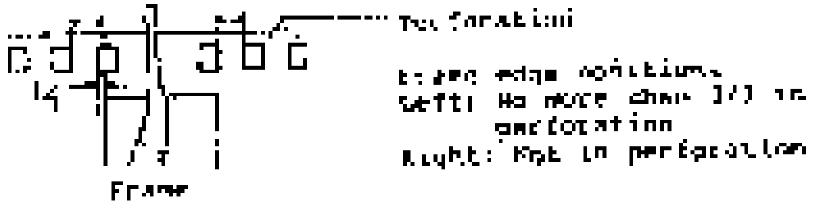
Caution: This standard is for a 90% / 2% reflectance chart. If the chart is soiled, the reflectance will be different. Reconfirm the correct VAT using a known-good body.

III. ADJUSTMENTS

A. Standard Adjustments

A.1 Perforation Adjustment

A.1. Standard:


Perforation
Frame edge positions
Left: No more than 1/3 in perforation
Right: Not in perforation
Frame

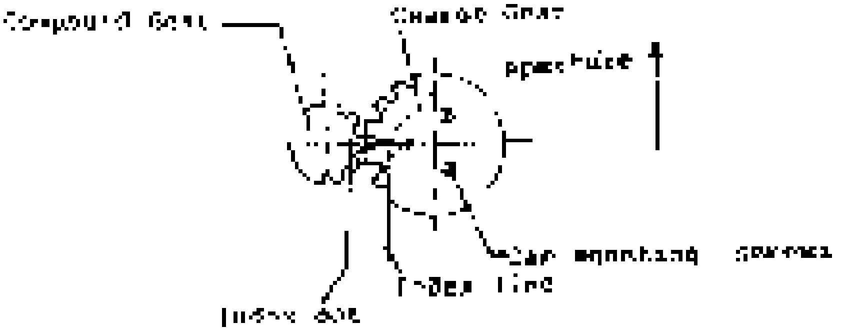
Using a length of film, insert the leader and wind several frames. Apply back tension and check the perforation position.

2. Adjustment

If the position is not correct, adjust as follows. There are two change gears and the mesh can be changed so there are several possibilities.

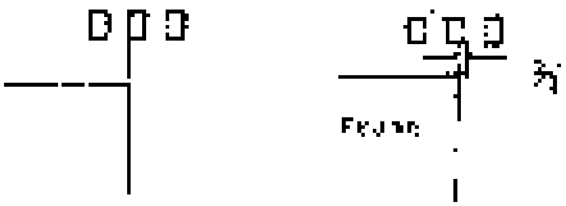
1. Always start with the 050 change gear. 050 means: chrome
0'0 means: black

With the mechanism moved, attach the gears as shown below.


Compound Gear
Change Gear
Aperture
Gear mounting screws
Index line
Index dot

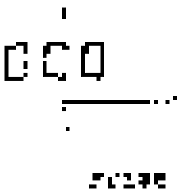
2. If the results are as shown below, leave the 050 change gear in place and change the mesh one tooth.

Example 1: Right edge of frame in perforation



4. Framing Adjustments

Example 2: Left edge of frame aligned with perforation edge.



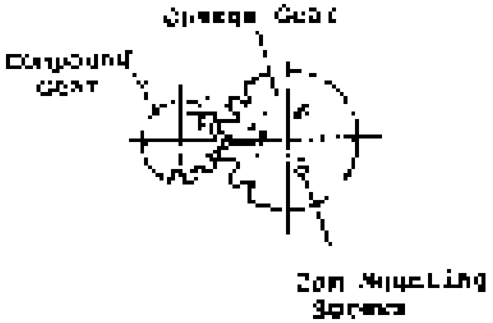

Change Gear
Compound Gear
Cam Mounting Screws

Fig. 2

3. If the results are as shown below in step 1, change to the old change gear and align the compound gear and change gear indices.

Example: Left edge of aperture in right 1/3 of perforation.

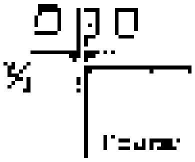
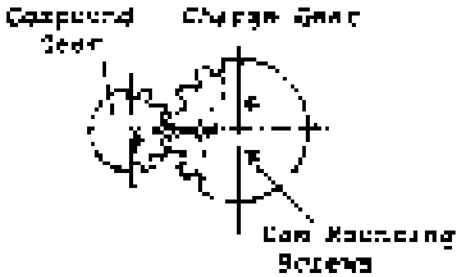


Fig. 3


Compound Gear
Change Gear
Cam Mounting Screws

4. If the results are as shown below in step 1, change to the old change gear and offset the compound gear and change gear indices one notch.

Example: Right edge of aperture in right 1/2 of perforation.

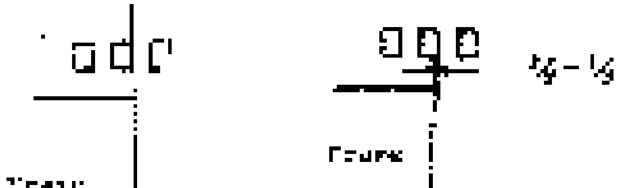

Frame
Frame
1/4 - 1/3

Fig. 4

5. ADJUSTMENTS

4. Winding Adjustments

Example 3: Left edge of perforation aligned with middle 1/4 to 1/2 of perforation.

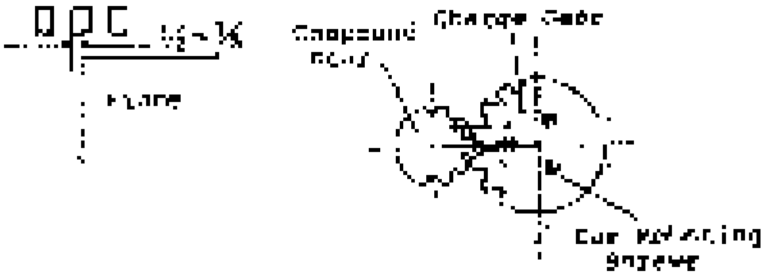
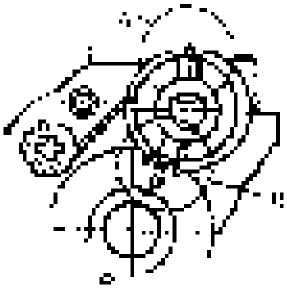

¼~½
Frame
Compound Gear
Change Gear
Car Retaining Screws

Fig. 4

4.2 Winding Gear (Lower)

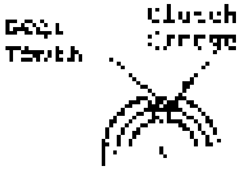


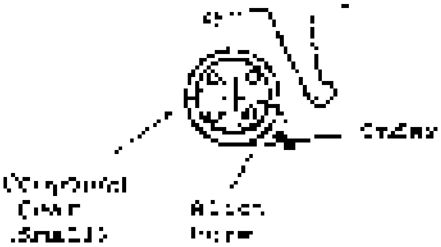
1. Assemble the sprocket clutch gear so the clutch groove align with the gear teeth as shown (A). (There are 3 points where they align correctly.

2. Now align this point with the index point on the large compound gear (B).

3. Install the small compound gear on the flatted shaft on the reverse side of the base

4. Apply clockwise pressure at (A) and check that one of the four marks on the small compound gear align with the index on the base. (C).


Gear Teeth
Clutch Groove


Index
Compound Gear (Small)
Align Here

II. ADJUSTMENT

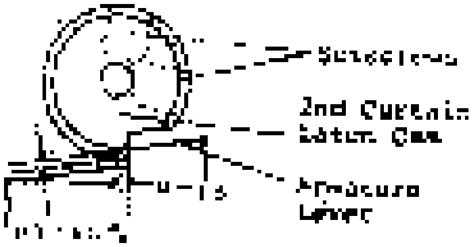
A. Winding Adjustment

---

3. 2nd Curtain Latch Position

1. Standard: Minus catch (0.0 – 0.15mm)
   Mesh 0.1 – 0.5mm

2. Adjustment
   a. Check the mesh.
   b. Apply the charge spring pressure.
   c. Recheck the mesh.
   d. Check with 2nd curtain magnet power off.
   e. If the mesh is too shallow, adjust and retighten the screws.
   f. Apply power to the magnet and check again in the bound position.
   g. Check in the wound condition.

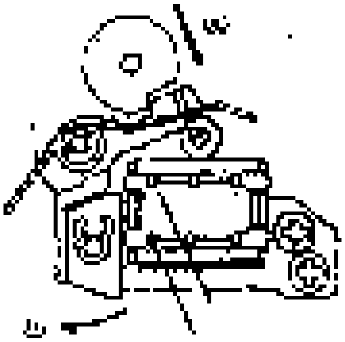


4. 2nd Curtain Magnet

1. Holding Power

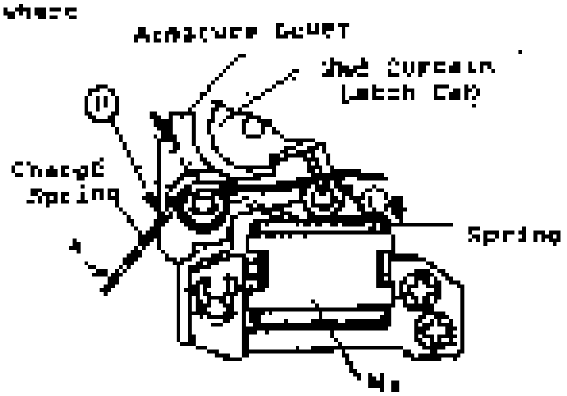
   A. Standard : 170 g or over

   B. Check
      1. Wind the mechanism.
      2. Apply power to magnet (camera power if assembled. 6V, 9mA if not)
      3. Press with a gauge at (A) and measure the force required to separate the armature from the yoke.
      4. If it is too low, change the magnet.



4. Winding Adjustments

3. 2nd Curtain Release Spring Tension
   A. Standard: 140 – 170g
   B. Check
      1. Apply the tension gauge 1mm from the end of the spring (A).
      2. Check the tension just where the spring starts (B).

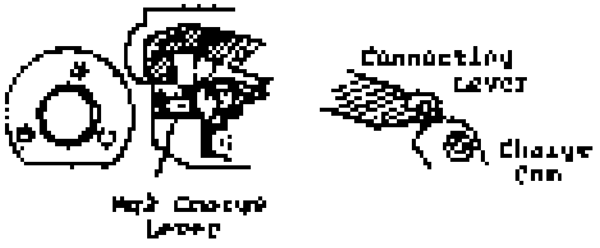

Armature Lever
2nd Curtain Latch Cam
①
Charge Spring
A
Spring
Mg

5. 2nd Curtain Release Return Pressure

   A. Standard: More than 47g less than [illegible]

   B. Check
      1. Measure at (1).
      2. Set the armature against the yoke.
      3. Letting the spring return, measure the tension when the armature and yoke part.

4. Overcharge
   A. Standard: 0.5 –0.9mm
   B. Adjustment
      Check with the connecting lever at the maximum lift of the charge cam. The overcharge of Mg2 Charge lever should be between 0.5 & 0.9mm. Adjust by changing the size of the connecting lever collar. (The check method is identical to the MD-4).


Connecting Lever
Charge Cam
Mg2 Charge Lever

5. Lubrication and Bonding

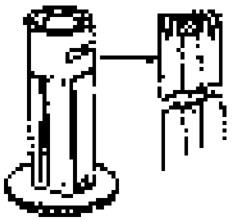
This division is divided into four sections, 1. Body, 2. Top Cover, 3. Front Panel, and 4. Shutter Unit. For each subsection, the information is listed numerically, 1. Part Name, 2. Lubricant/Bond, and 3. Special Instructions.

Expendables Order Numbers
(Current as of January, 1982)

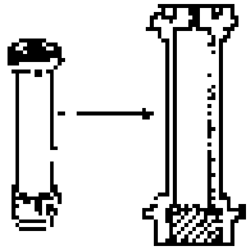
Bonds		Lubricants	
Pliobond	CY9-8001-000	Astrol	CY9-8012-000
Diabond	CY9-8002-000	UTIM 66	CY9-8035-000
Aronalpha 201 type	CY9-8008-000	LT-5H	CY9-8031-000
		Lomoid 72095	CY9-8037-000
Oil Retardant		Electrolube 2G-X	CY9-8039-000
OBF-10	CY9-8051-000	FL-25	CY9-8073-000

I. Body Section

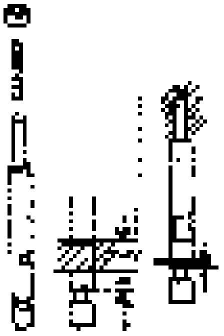
A. 1. Spool
   2. FL-25
   3. Apply to hatched area



B. 1. Sprocket
   2. FL-25
   3. Apply to hatched area

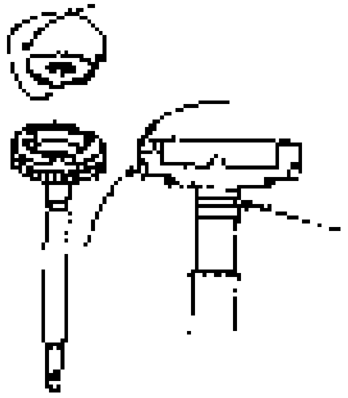


C. 1. Sprocket Shaft
   2. LT-5H
   3. Apply to hatched areas



D. 1. Winding Shaft Cover Plate
   2. Aronalite L
   3. Apply to arrow-marked points

E. 1. Winding Shaft Gear
   2. Lomoid 72095
   3. Apply to arrow-marked points



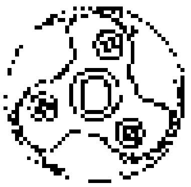
III. ADJUSTMENTS

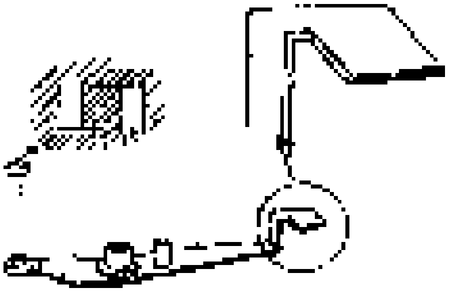
5. Lubrication and Grease

A. [illegible]
1. Winding Gear
2. [illegible]
3. Apply to hatched area

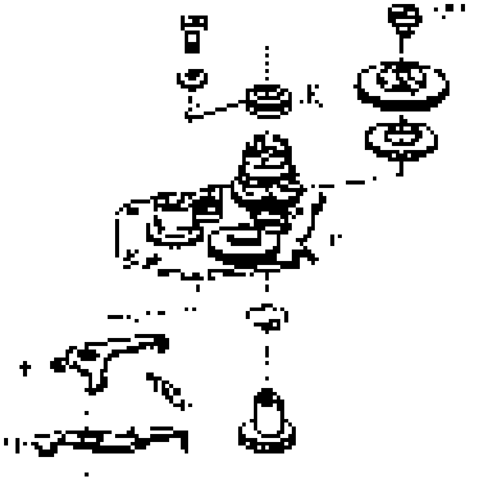
B. 1. Connecting Lever Roller
2. [illegible]
3. All surfaces

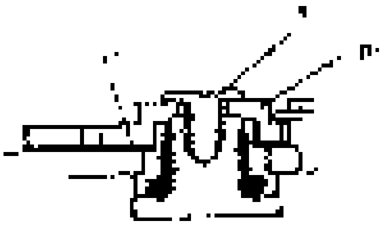
C. 1. Connecting Lever
2. [illegible]
3. Apply to cross-hatched area

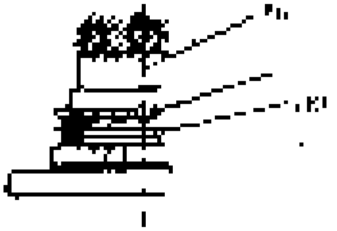


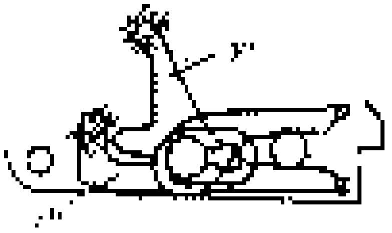


D. 1. Lower Winding Base
2. [illegible]
3. Apply to cross-hatched area
4. [illegible] (Blue can)
5. Apply to hatched area



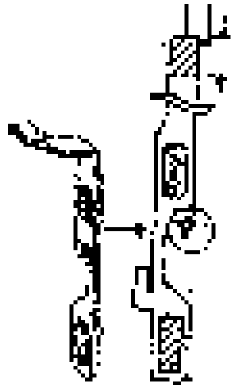




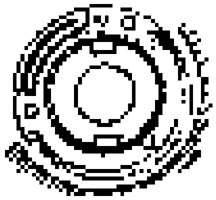


C. Lubrication and Bonding

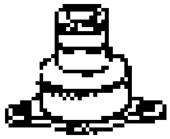
I. 1. Back Cover Hinge
2. LT-SH
3. Apply to hatched area



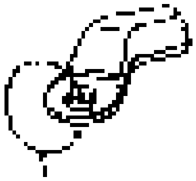
J. 1. ASA Contact
2. Electrolube 2G-X
3. Apply to hatched area



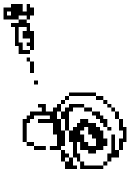
K. 1. Rewind Shaft Housing
2. Electrolube 2G-X
3. Apply to hatched area



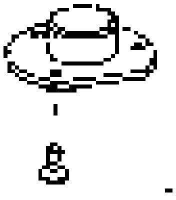
L. 1. Winding Lever
2. FL-15
3. Apply to arrow-marked points



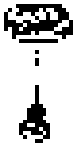
M. 1. Back Strap Lugs
2. Araldite (Blue cap)
3. Apply to threads



P. 1. Winding Coupler Screw
2. Araldite (Blue cap)
3. Apply to threads



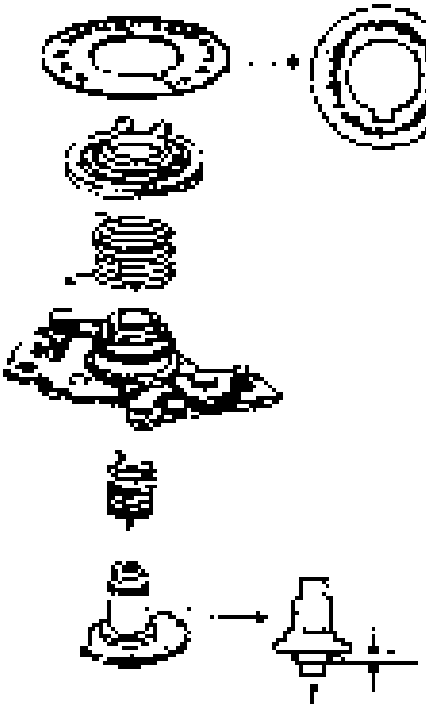
Q. 1. Tripod Socket Screws
2. Araldite (Blue cap)
3. Apply to threads



12. ADJUSTMENTS

5. [illegible]

1. Upper Winding Base [illegible]
2. [illegible]
3. Apply to [illegible]
4. [illegible]
5. Apply to [illegible] points



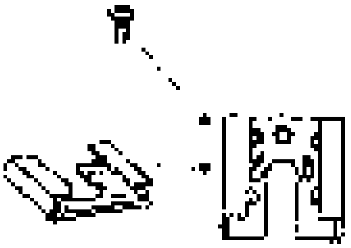
[illegible] ADJUSTMENTS

[illegible] Lubrication and Bonding

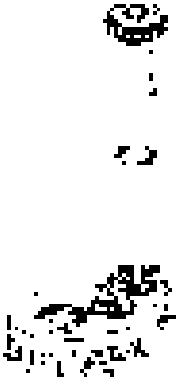
[illegible]

[illegible] Top Cover

A. 1. Accessory Shoe
2. Pliobond
3. Apply to marked area

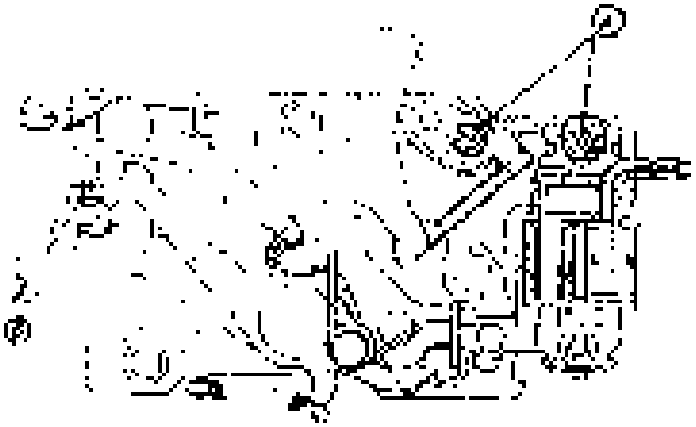


B. 1. Shutter Button Dial
1.A. Button Nails
2.A. [illegible]
1.B. Dial Bonding
2. Pliobond
3. Underside of dial



D. Front Panel Left Parts

E. 1. Auto Diaphragm [illegible]
2. Scotbond
3. Apply at points marked "A"
4. [illegible] 10
5. Apply at points marked "B"

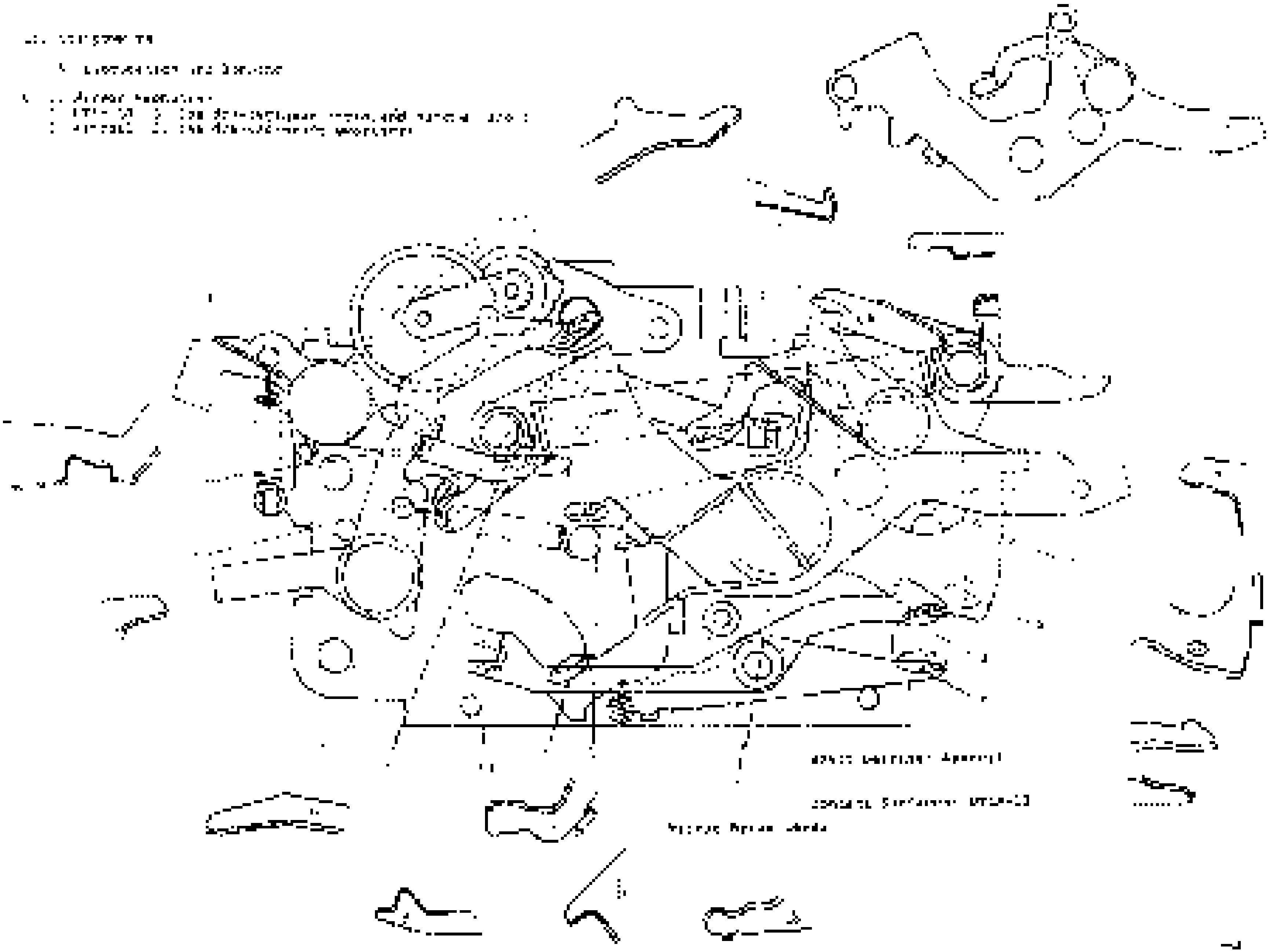


F. 1. [illegible]
2. Pliobond
3. Apply to [illegible]

[illegible]

[illegible]

[illegible]
[illegible]
[illegible]

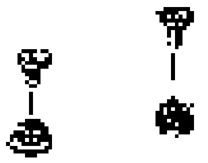


II. ADJUSTMENTS

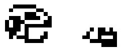
5. Lubrication and Bonding

I. Shutter Unit

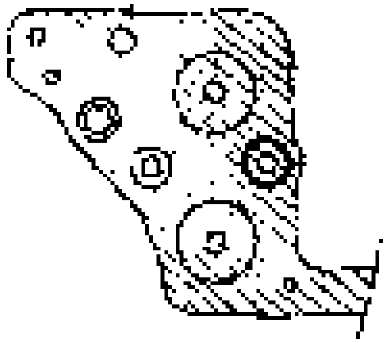
A. 1. Pinion Gear Screws
2. Araldite L
3. Apply to threads



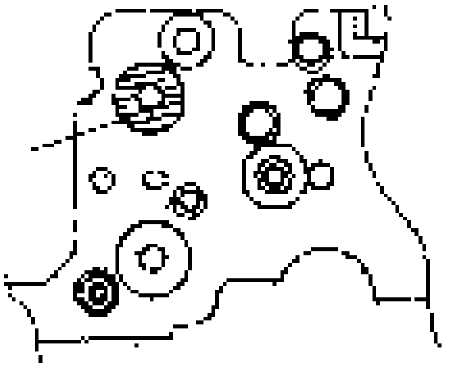
B. 1. 2nd Curtain Latch Screw
2. Araldite L
3. Apply to threads



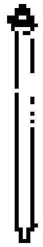
C. 1. Shutter Upper Member
2. Oil Retardant OR-16
3. Apply to hatched area



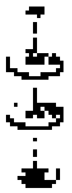
D. 1. Shutter Lower Member
2. Aeroshell
3. Apply to hatched areas



E. 1. 2nd Curtain Pinion Shaft
2. Oil Retardant
3. Apply to all surfaces



F. 1. Master Gear
2. Aeroshell
3. Apply to shaft bearing surfaces.



CANON SERVICE TOOLS LIST

CANON AL-1

(REF. NO. C12-1821, 1822)

TEST EQUIPMENT

(USE)		(NAME OF TEST EQUIPMENT)
1. Shutter		Shutter Tester (Model TJ-18C) or DA-1, Transistorized Shutter Tester or Simplified Shutter Tester.
2. Exposure Meter	2-1	Canon Light Source
	2-2	D.C. Voltage Tester (DOK Model VOAC 77 or VOAC 707) (Measuring Meter Accuracy, Unit: 1mV)
	2-3	Ohmmeter
	2-4	Standard Brightness Checker (Cds) or Canon Luminance Meter (E.V.C.-)
	2-5	Oscilloscope (General electrical circuit checks)
3. Range Viewfinder	3-1	Universal Range-viewfinder Collimator or Universal Rangefinder Collimator
	3-2	Focusing Charts (1 each)
	3-3	Oscilloscope
	3-4	D.C. Power Supply (for Light source)
	3-5	Service Standard FD 50mm 1:1.4 lens
4. Mirror Angle (45°)	4-1	Universal Type 90° Collimator
	4-2	AE-1 Inverted Mount
	4-3	Traveling Microscope
	4-4	Simplified 90° Collimator (if 4-1 is not available)
5. Field of View		Universal Range-viewfinder or Universal Parallax Collimator
6. FPD		42.14 Dial Gauge
7. Adjustment	7-1	SE12-7 Torque Gauge (2.0-7.0Kgcm) Clockwise (Common to Motor Drive)
	7-2	SS42-C12-1401-15 Torque Gauge Head (Common to AE-1)
	7-3	Retaining Ring Pliers (Local Purchase) (Common to AE-1)
	7-4	Depth Micrometer (Check Max. Aperture Correction Pin Height) (Local Purchase)

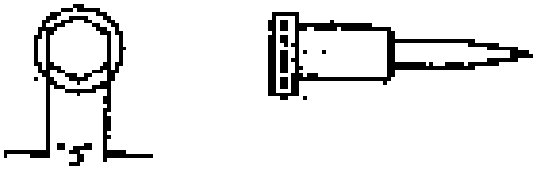
8. DT Adjustment Stand (for front panel)
(Front panel mounts in inverted position)

SPECIAL SCREW DRIVERS

(Use)

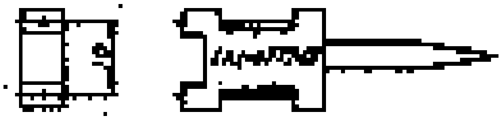
Tightening Sprocket Shaft

CY9-6113-010
(TB39-CA1-1768-16)
(Common to AE-1)



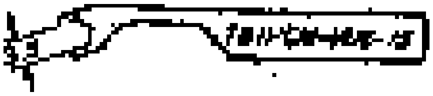
Tightening Winding Lever

CY9-6108-010
[TB39-CA1-4973-15]
(Common to AE-1 and AV-1)



Mirror Angle (45°) Adjusting Spanner

CY9-6026-010
(TB13-CA1-4018-19)
(Common to AE-1 and AV-1)



CANON AE-1 PROGRAM SERVICE PARTS POLICY

1. THE POLICY OF CAMERA SERVICE, TOKYO, IS TO STOCK ALL PARTS NECESSARY TO EFFECT EFFICIENT ECONOMICAL SERVICE. IT IS NEITHER NECESSARY NOR ECONOMICALLY FEASIBLE TO STOCK SEPARATELY EVERY PART THAT GOES INTO EACH PRODUCT.

IN ESTABLISHING THE SPARE PARTS LIST, WE CONSIDER REPAIR DIFFICULTY, LABOR COST, SPECIAL TOOL REQUIREMENTS AND INDIVIDUAL PARTS VS ASSEMBLED UNIT COST TO DETERMINE IN WHICH FORM PARTS WILL BE STOCKED.

2. RECENT REVIEW HAS SHOWN THAT IT IS MORE ECONOMICAL AND ADVANTAGEOUS TO THE CUSTOMER, THE SERVICE FACILITY AND US TO STOCK INDIVIDUAL PARTS UNLESS THERE IS AN OVERRIDING REASON FOR STOCKING PRE-ASSEMBLED UNITS.

THE UNITS LISTED BELOW ARE STOCKED AS UNITS BECAUSE THEY REQUIRE TOOLS OR TECHNICS NOT NORMALLY AVAILABLE AT FIELD SERVICE LEVEL.

CG9-2504-000	[illegible] SPOOL GEAR UNIT	CY1-1043-000	CURTAIN
CG9-2564-000	WINDING LEVER	CY1-1044-000	DRUM, 2nd CURTAIN
CG9-2564-000	WINDING LEVER (BL)	CY1-1045-000	ROLLER
CG9-2621-000	010 GEAR, CHARGE UNIT	CY1-1046-000	SPRING DRUM, 2nd CURTAIN

IN ADDITION TO THE ABOVE, WHICH ARE STOCKED ONLY AS UNITS, SOME INDIVIDUAL PARTS ARE STOCKED FOR THE FOLLOWING UNITS IN ADDITION TO THE UNIT.

CF2-0034-000	MIRROR UNIT	CG9-2616-000	FRONT COVER (BL)
CG1-0045-000	COVER, BACK	CG9-2619-000	BATTERY CONTACT UNIT
CG1-0155-000	MIRROR MECHANISM	CG9-2646-000	REWIND CRANK UNIT (BL)
CG1-0156-000	ELECTRIC PARTS UNIT	CY1-1040-000	1st CURTAIN BRAKE UNIT
CG1-0159-000	AUTO DIAPHRAGM UNIT	CY1-1041-000	2nd CURTAIN BRAKE UNIT
CG1-0160-000	SHUTTER UNIT	CY1-1042-000	SW & CONTACT UNIT
CG1-0164-000	AF UNIT	CY1-1103-000	TOP COVER UNIT
CG9-2508-000	REWIND CRANK UNIT	CY1-1104-000	TOP COVER UNIT (BL)
CG9-2610-000	ELECTRICAL PARTS UNIT	CY1-1105-000	COVER, BATTERY
CG9-2615-000	FRONT COVER	CY1-1105-000	ELECTRICAL PARTS UNIT

3. INDIVIDUAL ELECTRICAL COMPONENTS WHICH MAY REQUIRE REPLACEMENT ARE STOCKED. OTHERS ARE LISTED ON THE SCHEMATIC WITH THEIR SPECIFICATIONS.

4. THE SPARE PARTS LIST IS ADJUSTED PERIODICALLY TO INSURE THE NECESSARY PARTS ARE ALWAYS AVAILABLE, AND UNNECESSARY PARTS ARE REMOVED FROM THE STOCK LIST.

5. ASSEMBLIES SHOWN WITH THE "N.S." MARK ARE SHOWN FOR CLARITY ONLY. THEY ARE NOT STOCKED IN THE FORM SHOWN.

6. THE PARTS STOCKED AS SERVICE PARTS ARE NOT ALWAYS EXACTLY THE SAME PART USED ON THE ASSEMBLY LINE, BUT THEY ARE PROPERLY INTERCHANGEABLE (SCREWS, WASHERS, LEAD WIRE, ETC.)

キヤノン AL-1 サービス部品について

サービス部品は修理上の観点、工数、コスト、部品の使用頻度等、種々の要因を検討し、決定している。
特に、ユニット部品の構成部品の中、使用頻度の少ないものは、サービス部品とはしない。
キヤノンAL-1においては、次のような部品構成とする。

下記部品はユニットのみをサービス部品とする。

CG9-2531-000(1L0)	スプールギヤーユニット	CY1-1041-000	シャッター幕
CG9-2561-000	巻上げレバー	CY1-1044-000	後幕ドラム
CG9-2562-000	巻上げレバー（BL）	CY1-1046-000	先幕ドラム
CG9-2622-000(SI0)	チャージギヤーユニット	CY1-1045-000	先幕スプリングドラム
CG9-2622-000(BL0)	チャージギヤーユニット	CY1-1047-000	後幕スプリングドラム

下記部品はユニット及び使用頻度の高いと考えられる部品をサービス部品とする。

CY1-0831-000	ミラーユニット	CG9-2615-000	エプロンユニット
CG1-5032-000	接眼ユニット	CG9-2616-000	エプロンユニット（BL）
CG1-1155-000	ミラー受ユニット	CG9-2619-000	電池室ユニット
CG1-3156-000	電源接点ユニット	CY1-1049-000	先幕ブレーキユニット
CG9-2139-000	自動絞りユニット	CY1-1241-000	後幕ブレーキユニット
CG9-2149-000	シャッターユニット	CY1-1312-000	SW1接片ユニット
CG9-2152-000	AV接続ユニット	CY1-1153-000	上部カバーユニット
CG9-2393-000	巻戻しボタンユニット	CY1-1154-000	上部カバーユニット（BL）
CG9-2394-000	巻戻しボタンユニット（BL）	CY1-1195-000	電池蓋
CG9-2610-000	下部基板ユニット	CY1-1196-000	電気部品ユニット

電気部品及び一部のものにおいては、サービス部品としないが修理時のチェックが出来るよう部番を明示している。

注 上記、サービス部品指定されない部品でも状況に応じ、サービス部品として追加することもある。

注 ユニットの一部で、サービス部品としないものは「※印」マークをつけてある。

[illegible]

CANON AL-1, [illegible]

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WIRING DIAGRAM 2ND TYPE		
ELECTRIC PARTS UNIT [illegible]	16	C-9,10
WIRING DIAGRAM 3RD TYPE		
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[illegible] PARTS LIST	19,20	C-13,14
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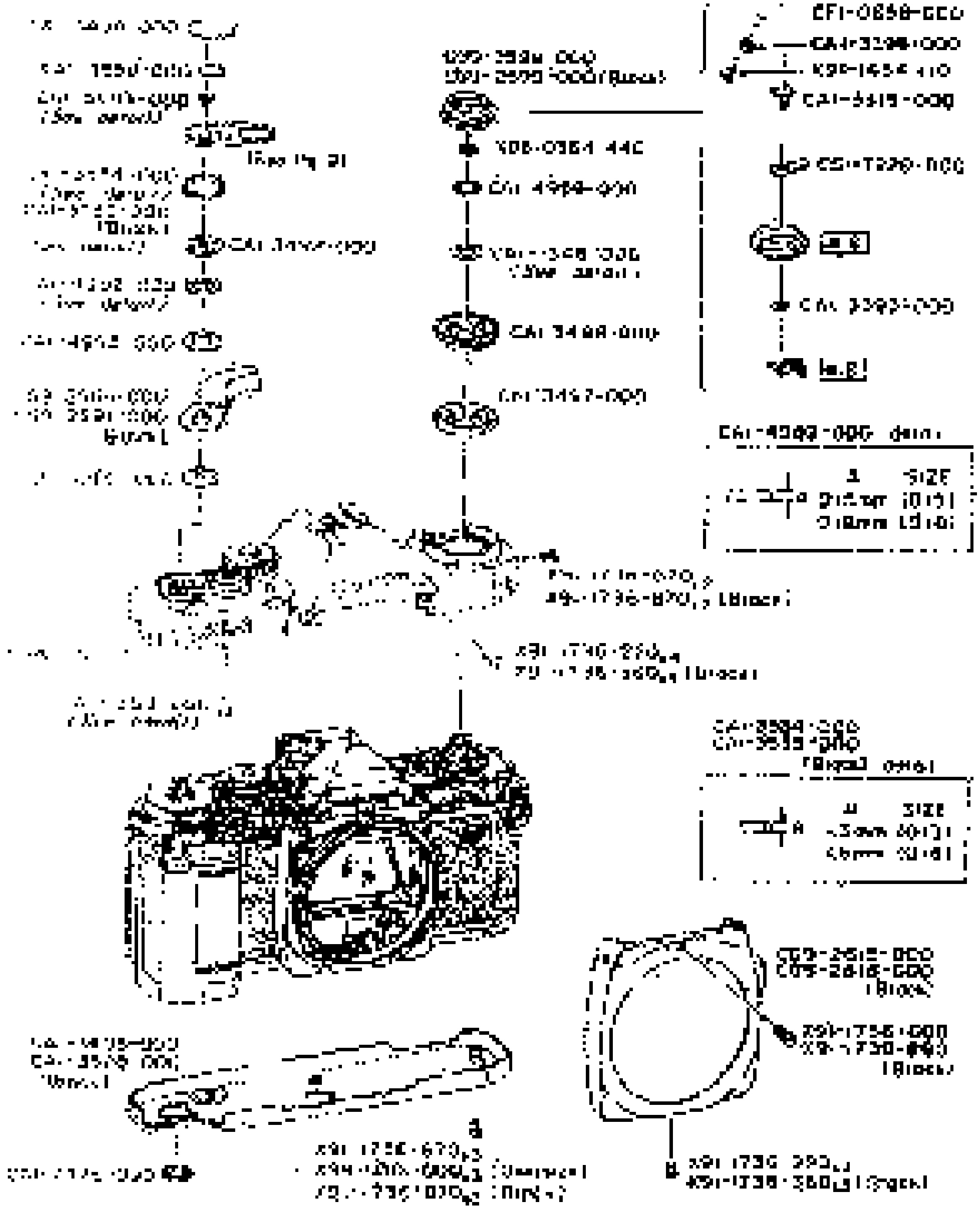
CANON AL-1, BLACK AL-1


CF1-0858-000
CA1-3294-000
XB?-1454-410
CA1-3415-000
XB6-0364-440
CA1-4994-000
CA1-3488-000
CA1-3457-000
CS1-7220-000
CA1-3393-000
(See Fig. 2)
(See detail)
(Black)
CA1-4962-000
CG9-2615-000
CG9-2616-000
(Black)
X91-1756-000
(Black)

CA1-4962-000 detail

A	SIZE
0.15mm	[illegible]
0.18mm	[illegible]

CA1-3594-000
CA1-3595-000 (Black) detail

A	SIZE
4.5mm	[illegible]
4.6mm	[illegible]

CA1-1359-000 detail

A	SIZE
1.0mm	[illegible]
1.1mm	[illegible]
1.2mm	[illegible]

CA1-3548-000 detail

A	SIZE
0.10mm	[illegible]
0.15mm	[illegible]
0.20mm	[illegible]

CA1-3495-000 detail

A	SIZE
0.80mm	[illegible]
1.00mm	[illegible]
1.20mm	[illegible]

REF. NO. [illegible]

PARTS LIST

WINDING LEVER & REWIND CRANK

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	CA1-[illegible]-000	D	1	WASHER, SPRING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-[illegible]-000	D	1	PIN, RELEASE
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-[illegible]-000	D	1	SCREW, REWIND CRANK
	CA1-3355-000	C	1	WASHER, RUBBER
	CA1-[illegible]-000	C	1	KNOB, REWIND CRANK
	CA1-3405-000	A	1	COVER, BASE
	CA1-3410-000	C	1	COVER, COUPLING
	CA1-3422-000	[illegible]	2	SCREW, [illegible]
	CA1-[illegible]-000	B	[illegible]	WASHER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-[illegible]-000	C	1	RUBBER
	CA1-3497-000	C	1	[illegible]
	CA1-[illegible]-000	C	1	BASE, ASA DIAL
	CA1-3528-000	B	1	COVER, BASE [illegible]
	CA1-3534-000	D	1	RING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3535-000	D	1	RING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3550-000	F	1	CAP, REST
	CA1-[illegible]-000	D	1	E RING
	CA1-[illegible]-000	C	1	WASHER, SPRING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-[illegible]-000	C	1	RUBBER
	CA1-[illegible]-000	F	1	SEAT, WINDING
	CA1-[illegible]-000	B	1	CRANK, REWIND
	[illegible]-000	B	1	LEVER, WINDING
	[illegible]-000	B	1	LEVER, WINDING
	[illegible]-000	B	1	REWIND CRANK UNIT
	[illegible]-000	B	1	REWIND CRANK UNIT (BL)
	[illegible]-000	A	1	COVER, FRONT
	[illegible]-000	D	1	COVER, FRONT (BL)
	[illegible]-000	F	1	SPRING, DETENT
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		2	SCREW, CROSS-RECESS, PH
	[illegible]		2	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		5	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		5	SCREW, CROSS-RECESS, PH
	[illegible]		2	WASHER
	[illegible]		5	SCREW, CROSS-RECESS, PH

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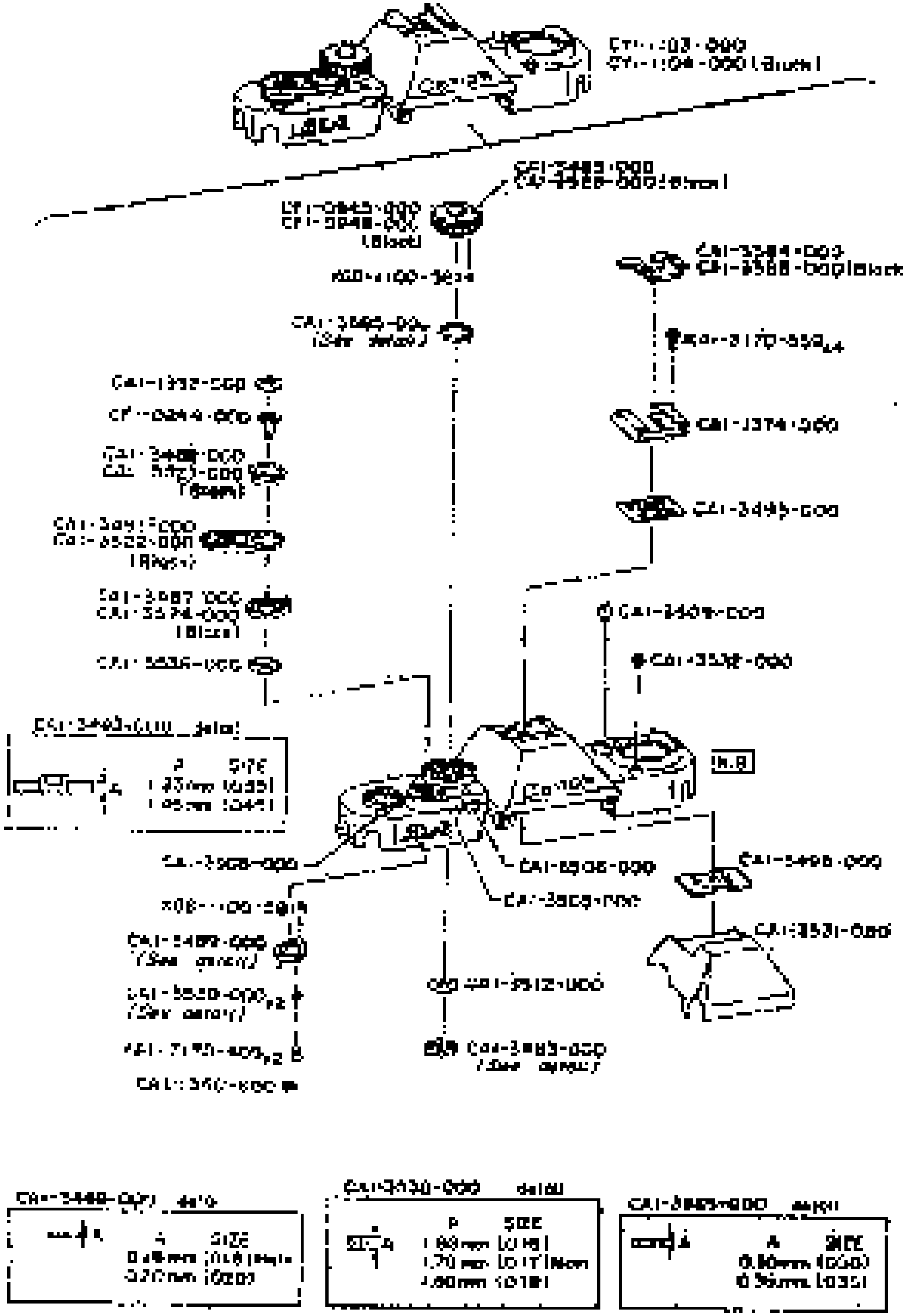
CANON AL-1, BLACK AL-1


CY1-1103-000
CY1-1104-000 (Black)
CA1-3483-000
CA1-3520-000 (Black)
CY1-0845-000
CY1-0848-000 (Black)
XG0-4100-3034
CA1-3486-000 (See detail)
CA1-3384-000
CA1-3588-000 (Black)
XA4-2170-552 x4
CA1-1332-000
CY1-0244-000
CA1-3488-000
CA1-3523-000 (Black)
CA1-3491-000
CA1-3522-000 (Black)
CA1-3487-000
CA1-3524-000 (Black)
CA1-3536-000
CA1-1374-000
CA1-3495-000
CA1-3409-000
CA1-3532-000
CA1-3493-000 detail
P SIZE
1.43mm (.055)
1.45mm (.044)
N.B
CA1-3508-000
CA1-3506-000
CA1-3509-000
X06-1100-2014
CA1-3489-000 (See detail)
CA1-3530-000 x2 (See detail)
XA1-7175-400 x2
CA1-3507-000
CA1-3512-000
CA1-3485-000 (See detail)
CA1-3496-000
CA1-3531-000
CA1-3489-000 detail
A SIZE
0.48mm (.019)(Black)
0.50mm (.020)
CA1-3530-000 detail
P SIZE
1.60mm (.063)
1.70mm (.067)(Black)
4.60mm (.181)
CA1-3485-000 detail
A SIZE
0.80mm (.030)
0.90mm (.035)

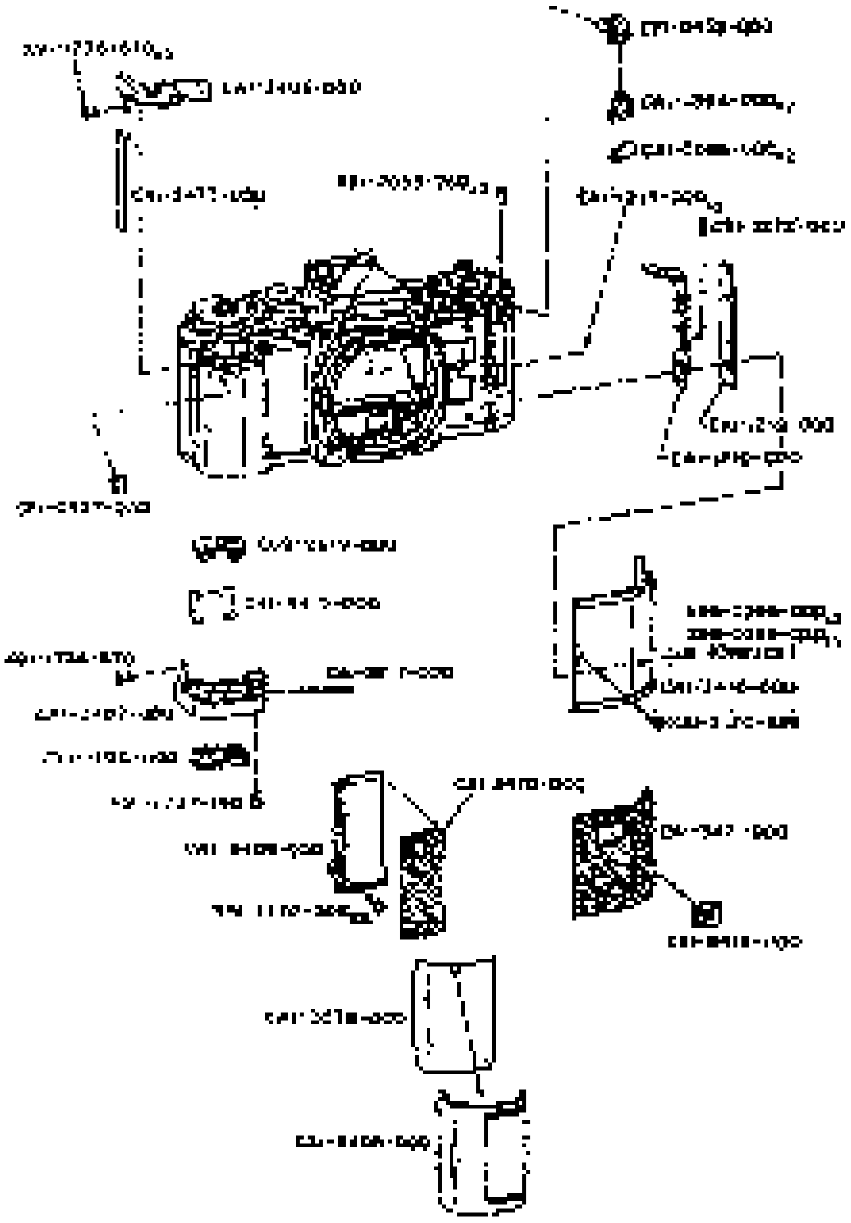
REF. NO. C14-1971.?

PARTS LIST

TOP COVER

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	CA1-1372-000	C	1	BUTTON, WA CASE
	CA1-1390-000	C	1	RETAINER
	CA1-1314-000	B	1	SPACER, ACCESSORY
	CA1-[illegible]	C	1	SPRING, PLATE
	CA1-3783-000	C	1	SPRING, PLATE (AL)
	CA1-3483-002	D	1	COUPLER, SHUTTER DIAL
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3465-000	D	1	DIAL, SHUTTER
	CA1-3485-000	D	1	RING, SELF-LOCK
	CA1-3484-000	D	1	SEAT, SHUTTER BUTTON
	CA1-3485-000	D	1	ACTIVATOR, SELF-TIMER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3496-000	D	1	REST, FINGER
	CA1-3495-000	B	1	BASE, ACCESSORY SHOE
	CA1-3498-000	D	2	PLATE, MOUNTING
	CA1-3503-000	C	1	STOPPER, SELF-TIMER
	CA1-3506-000	C	1	WINDOW, SELF-TIMER
	CA1-3408-000	C	1	WINDOW, FILM COUNTER
	CA1-3527-000	C	1	BUTTON, [illegible] RELEASE
	CA1-3511-000	C	1	PLATE, CLICK
	CA1-3529-000	C	1	BASE, CLICK (AL)
	CA1-3?2?-000	C	1	SEAT, SHUTTER BUTTON (AL)
	CA1-3?3?-000	C	1	RING, SELF-LOCK (AL)
	CA1-3?2?-000	C	1	DIAL, SHUTTER
	CA1-3530-000	C	1	COLLAR, CLICK
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3531-000	C	1	SHEET
	CA1-3532-000	C	1	BUTTON, R.C.
	CA1-3536-000	D	1	PLATE, CLICK
	CA1-35??-000	C	1	SPRING, CLICK
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3545-000	C	1	BASE, SHUTTER DIAL
	CA1-3546-000	C	1	SHAFT, RELEASE BUTTON
	CA1-3548-000	C	1	BASE, SHUTTER DIAL (AL)
	CA1-1?05-000	B	1	TOP COVER UNIT
	CA1-1?06-000	B	1	TOP COVER UNIT (AL)
	XA?-3170-???		?	SCREW, CROSS-RECESS, FCH
	XA?-????-???		2	SCREW, CROSS-RECESS, ?H
	XB?-????-???		2	BALL, STEEL

CANON AL-1, BLACK AL-1



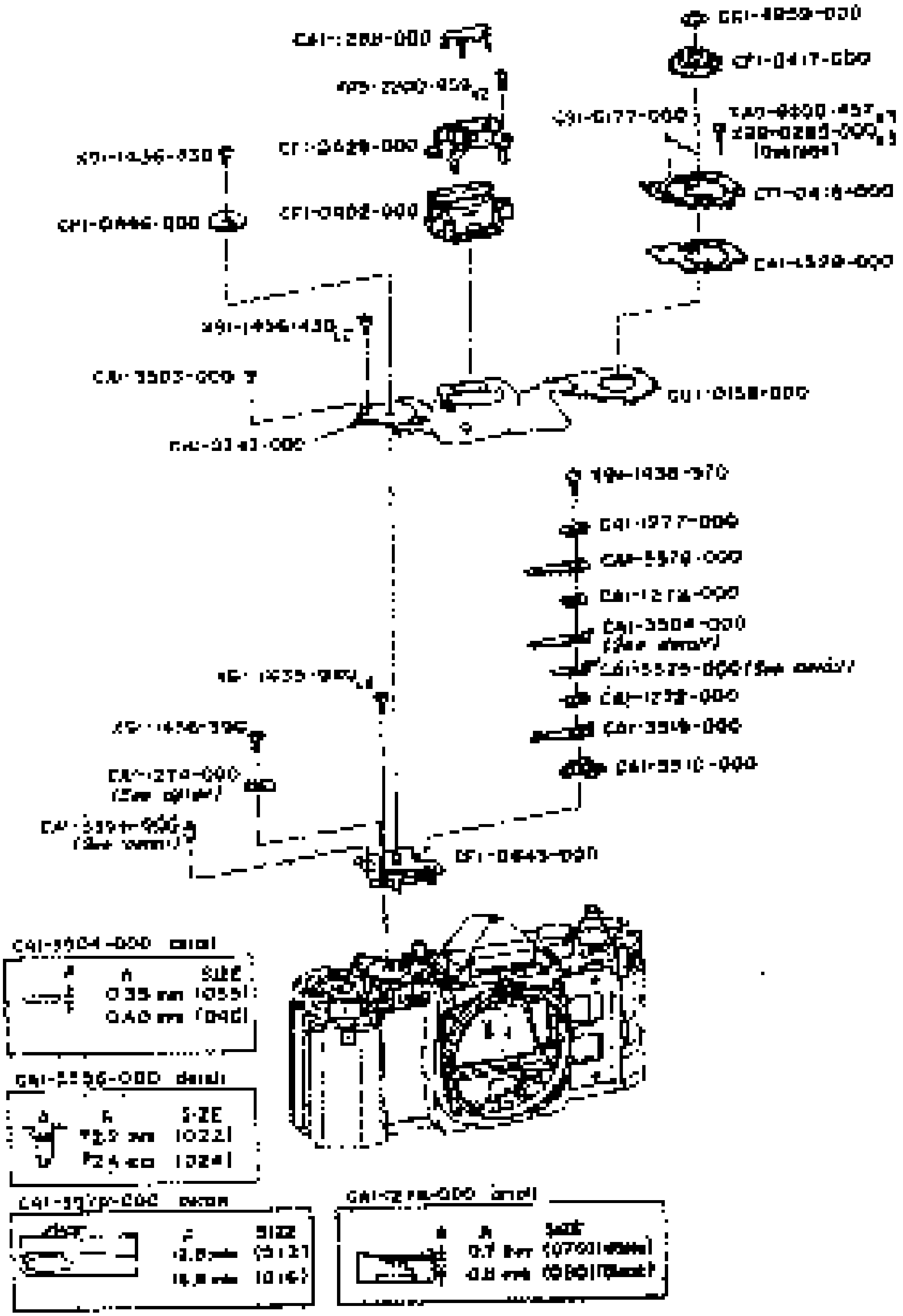
REF. NO. [illegible]

PARTS LIST

COVERS

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	[illegible]	1	HOOK
	[illegible]	[illegible]	[illegible]	COLLAR
	[illegible]	[illegible]	[illegible]	COVER, SPRING
	[illegible]	[illegible]	[illegible]	ADAPTER, NECK STRAP
	[illegible]	D	[illegible]	TOP, GRIP
	[illegible]	D	[illegible]	BASE, GRIP
	[illegible]	[illegible]	1	COVER, GRIP
	[illegible]	C	1	COVER, RIGHT FRONT
	[illegible]	B	1	COVER, LEFT FRONT
	[illegible]	[illegible]	1	COVERING, RIGHT
	[illegible]	[illegible]	[illegible]	COVERING, LEFT
	[illegible]	C	[illegible]	COVER, END
	[illegible]	D	1	SHEET, HINGE
	[illegible]	[illegible]	1	TAPE, GRIP
	[illegible]	[illegible]	2	RING, ADAPTOR, NECK STRAP
	[illegible]	[illegible]	1	LUG, NECK STRAP
	[illegible]	[illegible]	1	LUG, NECK STRAP
	[illegible]	[illegible]	1	BATTERY CONTACT UNIT
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	[illegible]	SEAL, BATTERY
	[illegible]	[illegible]	[illegible]	LOGO, EF
	[illegible]	[illegible]	[illegible]	COVER, BATTERY
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		2	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, FCH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, FCH

CANON AL-1, BLACK AL-1


CA1-1268-000
XA5-2290-450 ×2
CF1-2626-000
XA1-1436-430
CF1-0446-000
CF1-0902-000
XA1-1456-430 ×2
CA1-3503-000
CA2-0343-000
CB1-4959-000
CF1-0417-000
CA1-0177-000
XA0-4400-457 ×1
XB0-0283-000 ×1
(washer)
CF1-0416-000
CA1-4529-000
CG1-0158-000
XA4-1438-370
CA1-1977-000
CA1-5570-000
CA1-1272-000
CA1-3504-000
(See detail)
CA1-5575-000 (See detail)
CA1-1273-000
CA1-3514-000
CA1-3510-000
XA1-1435-950 ×2
XA1-1456-396
CA1-1274-000
(See detail)
CA1-3591-000
(See detail)
CF1-0643-000
CA1-3504-000 detail
A
A
SIZE
0.35 mm (035)
0.40 mm (040)
CA1-5556-000 detail
A
A
SIZE
2.2 mm (022)
2.4 mm (024)
CA1-5570-000 detail
A
SIZE
12.8 mm (012)
16.8 mm (016)
CA1-1274-000 detail
A
A
SIZE
0.7 mm (070)(Silver)
0.8 mm (080)(Black)

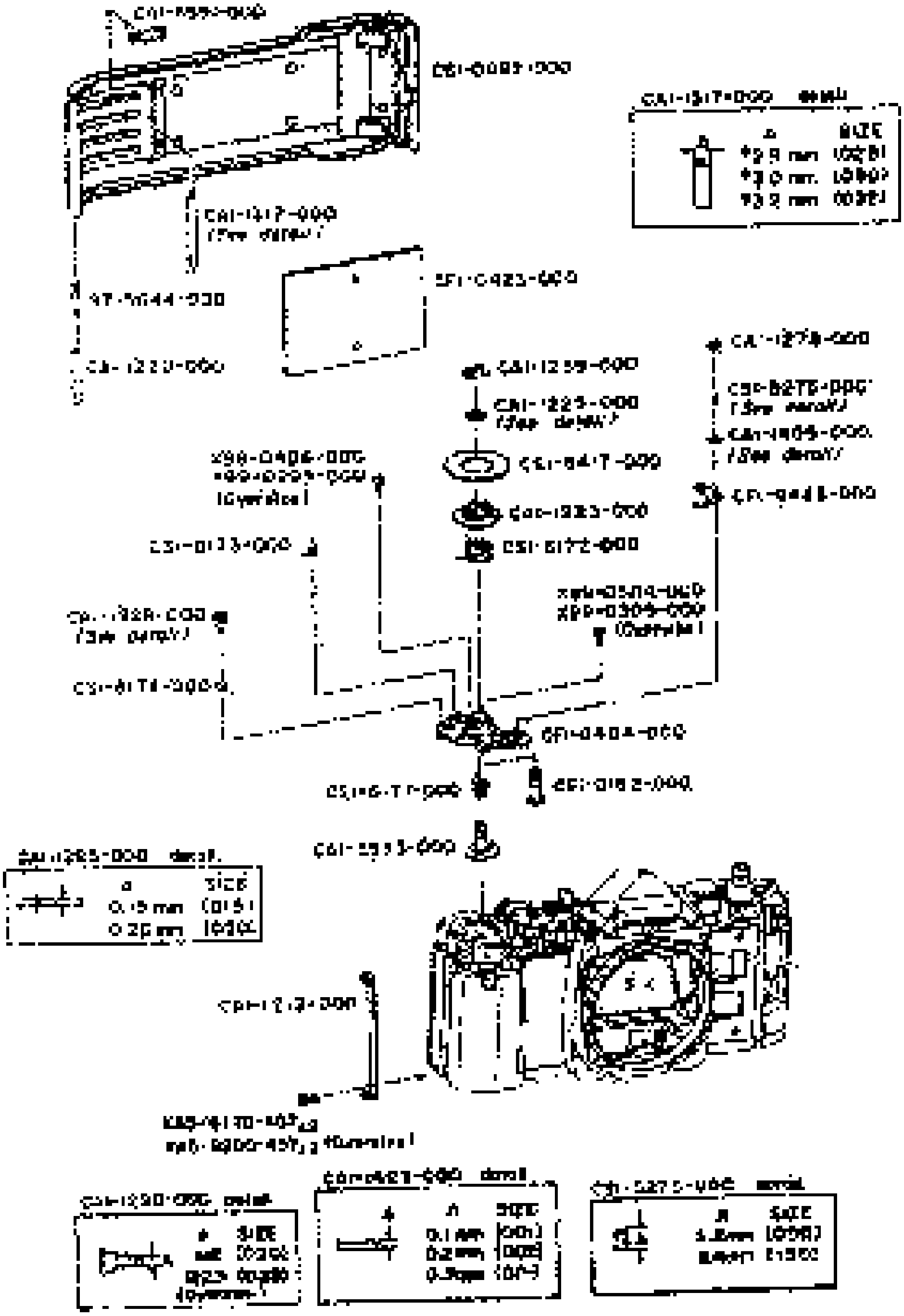
[illegible]

PARTS LIST

[illegible] COUNTER & ELECTRIC PARTS UNIT

ITEM	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	E	2	INSULATOR
	[illegible]	E	1	STOPPER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	SPACER
	[illegible]	E	1	HOLDER, SPC
	[illegible]	[illegible]	5	SHEET, INSULATOR
	[illegible]	E	1	CONTACT, [illegible]
	[illegible]	D	1	RELEASE CONTACT HOLD
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	BASE, CONTACT
	[illegible]	D	1	RELEASE CONTACT HOL
	[illegible]	[illegible]	1	SCREW
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	D	1	CONTACT, RELEASE
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	D	1	RELEASE CONTACT HOL
	[illegible]	[illegible]	[illegible]	C RING
	[illegible]	[illegible]	2	ENDPIECE
	[illegible]	C	1	BASE PLATE, ASM
	[illegible]	C	[illegible]	CONTACT, ASM
	[illegible]	B	1	HOLDER, SPC
	[illegible]	E	1	BASE, SHUTTER [illegible]
	[illegible]	C	1	LEVER, SHUTTER
	[illegible]	C	1	ELECTRIC PARTS UNIT
	[illegible]	C	4	BOARD, SHUTTER MODE
	[illegible]	D	1	SPRING
	[illegible]		2	SCREW, CROSS-RECESS, [illegible]
	[illegible]		3	SCREW, CROSS-RECESS, [illegible]
	[illegible]		2	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		3	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]

CANON AL-1, BLACK AL-1


CA1-[illegible]-000
CB1-0085-000
CA1-1317-000 detail
Δ
SIZE
t2.9 mm (028)
t3.0 mm (030)
t3.2 mm (032)
CA1-1317-000
(See detail)
CB1-0423-000
XA1-5044-030
CA1-1220-000
CA1-1278-000
CA1-1259-000
CA1-1225-000
(See detail)
CB1-B275-000
(See detail)
CA1-1405-000
(See detail)
X99-0406-000
X99-0293-000
(Cymbal)
CB1-6417-000
CA1-1223-000
CB1-6172-000
CB1-0448-000
CS1-0133-000
CA1-1328-000
(See detail)
X99-0514-000
X99-0305-000
(Cymbal)
CS1-6174-000
CB1-0404-000
CS1-6-71-000
CB1-0152-000
CA1-2553-000
CA1-1225-000 detail
Δ
SIZE
0.15 mm (015)
0.20 mm (020)
CA1-1212-000
XA5-4170-457
XA6-6200-457
(Cymbal)
CA1-1220-000 detail
Δ
SIZE
[illegible]
[illegible]
(Cymbal)
CA1-1328-000 detail
Δ
SIZE
0.1 mm (001)
0.2 mm (002)
0.3 mm (003)
CB1-B275-000 detail
Δ
SIZE
[illegible] mm (056)
[illegible] mm (150)

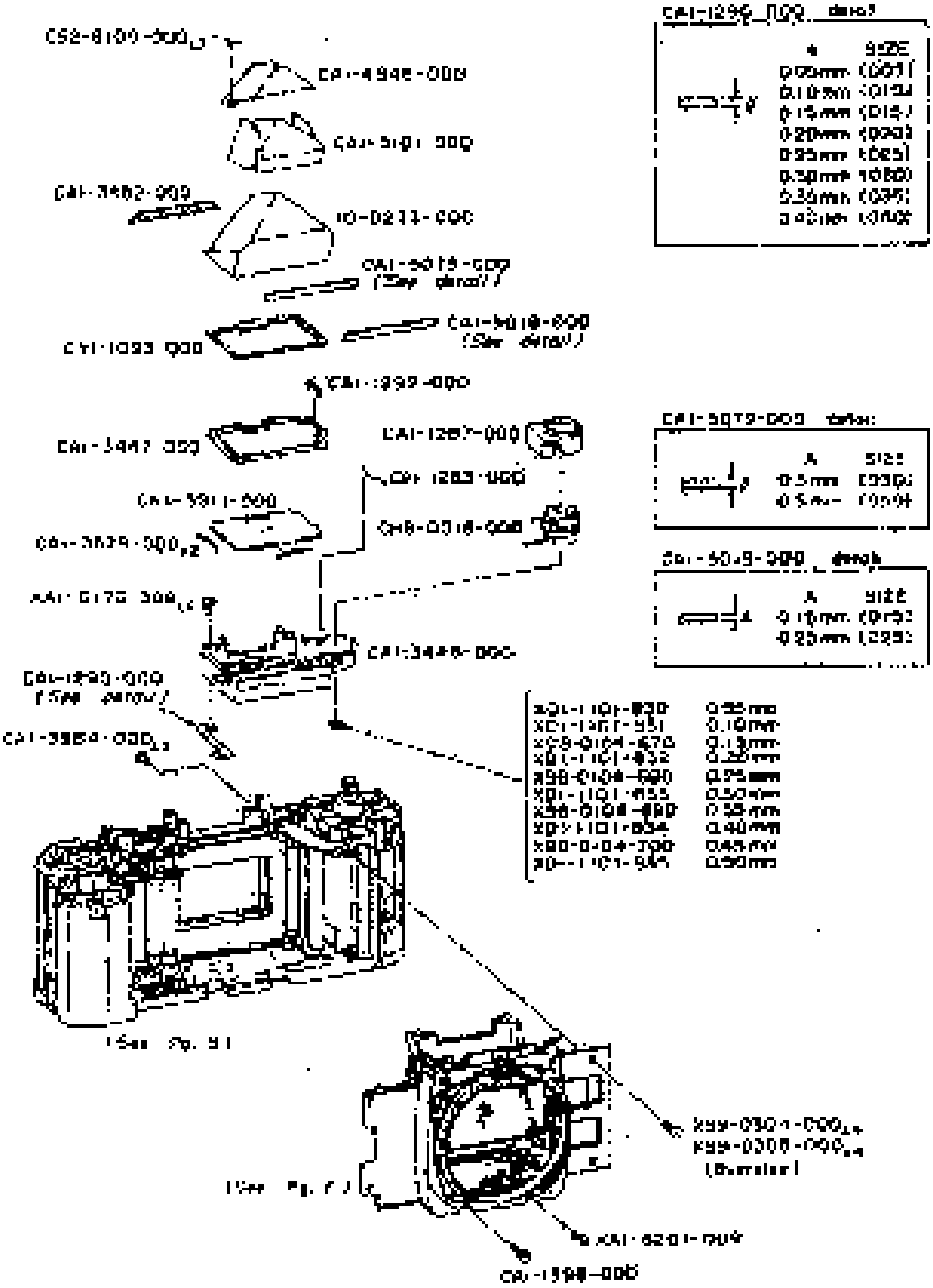
[illegible]

PARTS LIST

[illegible] COVER & [illegible] PARTS

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	C	1	COIL SPRING
	[illegible]	C	2	HINGE
	[illegible]	[illegible]	2	SHAFT, HINGE
	[illegible]	[illegible]	2	KNOB, FRAME COUNTER
	[illegible]	[illegible]	2	WASHER
	(ORDER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	[illegible]	1	SCREW
	[illegible]	[illegible]	1	E RING
	[illegible]	[illegible]	1	E RING
	[illegible]	[illegible]	1	WASHER
	(ORDER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	[illegible]	1	WASHER
	(ORDER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	[illegible]	1	SHAFT
	[illegible]	C	1	LIGHT SHIELD
	[illegible]	C	1	BASE, BEARING
	[illegible]	[illegible]	1	PLATE, PRESSURE
	[illegible]	D	1	CONTACT, SW
	[illegible]	C	1	PANEL, BACK
	[illegible]	[illegible]	1	GEAR, [illegible]
	[illegible]	D	1	SPRING, COIL
	(ORDER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	DIAL, FILM COUNTER
	[illegible]		2	SCREW, CROSS-RECESS, PCH
	[illegible]		2	SCREW, CROSS-RECESS, PCH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PCH
	[illegible]		2	SCREW, CROSS-RECESS, PCH
	[illegible]		1	SCREW, CROSS-RECESS, PH

CANON AL-1, BLACK AL-1


CS2-8100-000
CA1-4946-000
CA1-5101-000
CA1-3682-000
10-0233-000
CA1-5079-000
(See detail)
CA1-5049-000
(See detail)
CY1-1093-000
CA1-1999-000
CA1-3447-000
CA1-1287-000
CA1-1283-000
CA1-3311-000
CA1-3629-000
CH8-0318-000
XA1-0170-300
CA1-3446-000
CA1-1296-000
(See detail)
CA1-3654-000
XO1-1101-830 0.05mm
XO1-1101-851 0.10mm
X58-0104-670 0.15mm
XO1-1101-852 0.20mm
X58-0104-690 0.25mm
XO1-1101-855 0.30mm
X58-0104-680 0.35mm
XO1-1101-854 0.40mm
X00-0104-700 0.45mm
XO1-1101-945 0.50mm
(See Fig. 5)
(See Fig. 7)
X99-0304-000
X99-0308-000
(Burrs)
XA1-8201-909
CA1-1398-000
CA1-1296-000 detail
A SIZE
0.05mm (005)
0.10mm (010)
0.15mm (015)
0.20mm (020)
0.25mm (025)
0.30mm (030)
0.35mm (035)
0.40mm (040)
A
CA1-5079-000 detail
A SIZE
0.3mm (030)
0.5mm (050)
A
CA1-5049-000 detail
A SIZE
0.15mm (015)
0.25mm (025)
A

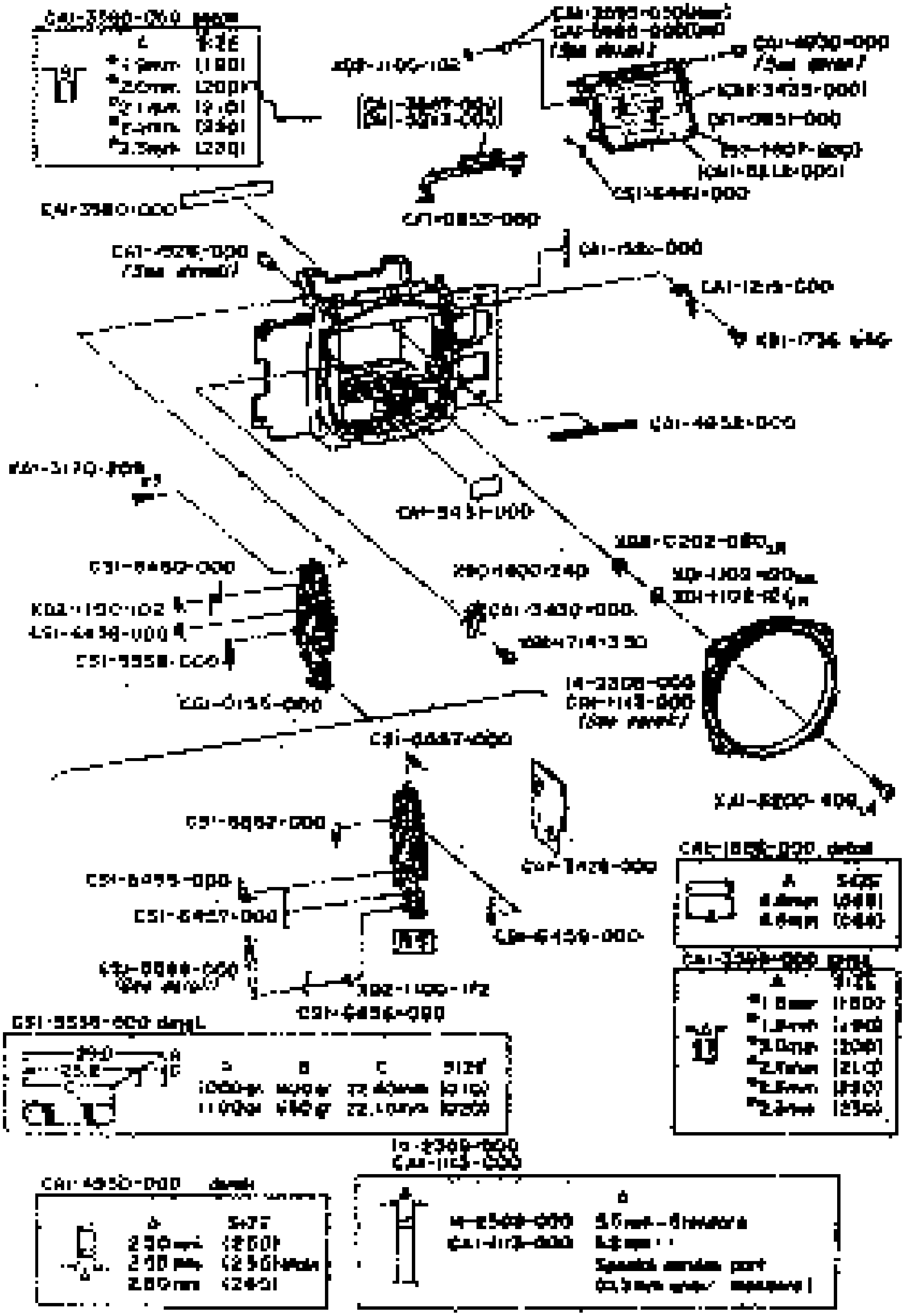
[illegible]

PARTS LIST

RENDER PARTS

MARK	PART NO.	CLASS	QTY.	DESCRIPTION
	LD-2233-100	C	1	PENTAPRISM
	CA1-3748-000	C	1	BAR, METER HOLDER
	CA1-3387-000	C	1	COVER, METER
	CA1-3258-000	D	1	WASHER, ADJUSTING
	(CENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-3393-000	C	1	STOPPER
	CA1-3396-000	D	1	SCREW
	CA1-3446-000	E	1	HOLDER, PENTAPRISM
	CA1-3447-000	E	1	WASHER
	CA1-3452-000	D	1	SPACER
	CA1-3579-000	D	2	PLATE, SPRING
	CA1-3584-000	C	3	SCREW
	CA1-[illegible]-000	C	1	HOLDER, PENTAPRISM
	CA1-5016-000	C	1	SPACER
	(CENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-5073-000	D	1	SPACER
	(CENTER SIZE WHEN ORDERING, SEE DETAIL)			
	CA1-5881-000	C	1	COVER, PENTAPRISM
	[illegible]	C	1	METER
	CA1-8819-000	C	3	SCREW, FOCUSING
	CA2-8397-000	E	2	SPRING
	CA1-[illegible]-000	C	1	MASK, FINDER
	XA1-1130-[illegible]		4	SCREW, CROSS-RECESS, PH
	XA1-4201-000		1	SCREW, CROSS-RECESS, PH
	XD1-1101-630		1	WASHER
	XD1-1101-631		1	WASHER
	XD1-1101-632		1	WASHER
	XD1-1101-633		1	WASHER
	XD3-3101-[illegible]		2	WASHER
	XD3-[illegible]-035		1	WASHER
	XD9-0104-630		1	WASHER
	XD9-0104-640		1	WASHER
	XD9-0104-650		1	WASHER
	XD9-0104-760		1	WASHER
	XB9-0306-000		4	SCREW, CROSS-RECESS, TCH
	XB9-0103-000		4	SCREW, CROSS-RECESS, TCH

CANON AL-1, BLACK AL-1


CA1-3590-000 detail
A
SIZE
1.9mm (190)
2.0mm (200)
2.1mm (210)
2.2mm (220)
2.3mm (230)
XA4-1170-102
CA1-3095-050
CA1-3440-000
(See detail)
CA1-4950-000
(See detail)
CA1-3435-000
CA1-0851-000
CA1-3547-000
CA1-6116-000
CS1-6441-000
CA1-3580-000
CA1-0853-000
CA1-4526-000
(See detail)
CA1-1866-000
CA1-1215-000
CA1-1736-000
CA1-4952-000
XA1-3170-308
CA1-5431-000
XA4-0202-080
CS1-6450-000
XA0-1400-240
XD-1100-400
XD1-1102-424
XD2-1150-102
CS1-6436-000
CA1-3400-000
XA4-7140-350
CS1-5558-000
CA1-0156-000
14-2308-000
CA1-1113-000
(See detail)
CS1-6447-000
XA1-8200-400
CS1-6467-000
CA1-3420-000
CA1-1866-000 detail
A
SIZE
4.4mm (044)
4.6mm (046)
CS1-6455-000
CS1-6427-000
CS1-6459-000
CA1-3590-000 detail
A
SIZE
1.8mm (180)
1.9mm (190)
2.0mm (200)
2.1mm (210)
2.2mm (220)
2.3mm (230)
CA1-0000-000
(See detail)
XD2-1100-172
CS1-6456-000
CS1-5558-000 detail
A
B
C
SIZE
1050g
1100g
22.40mm
22.10mm
(210)
(220)
14-2308-000
CA1-1113-000
CA1-4950-000 detail
A
SIZE
2.50mm (250)
2.50mm (250)Main
2.60mm (260)
A
14-2308-000
CA1-1113-000
5.0mm-Standard
5.0mm
Special service part
(5.3mm after measured)

REF. NO. [illegible]

PARTS LIST

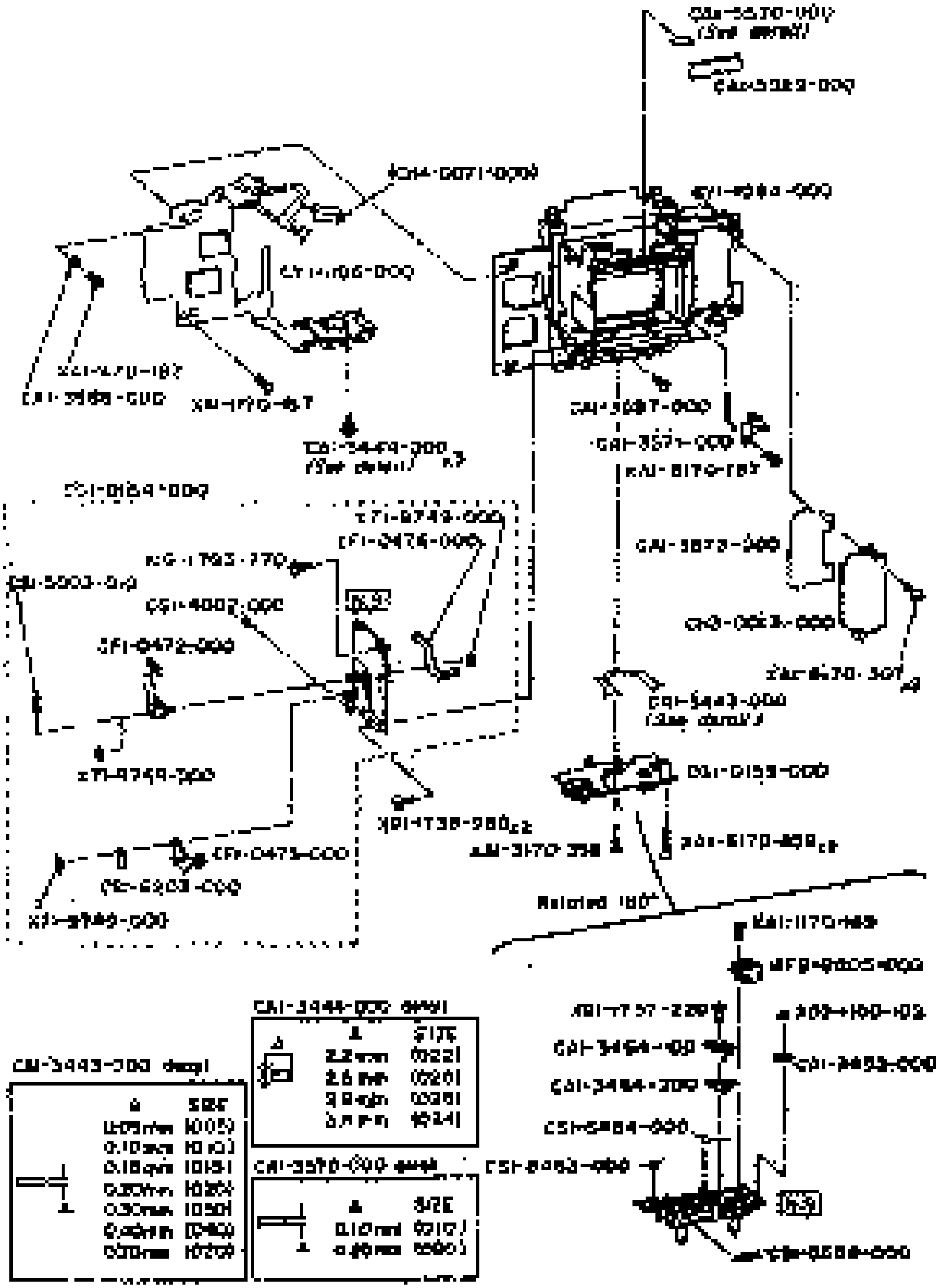
[illegible]

ITEM	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	B	1	BODY MOUNT
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	C	1	MIRROR HOLDER
	[illegible]	C	1	BOSS MOUNT
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	A	1	CONTACT
	[illegible]	E	1	BOARD, PRINTED CIRCUIT
	[illegible]	D	1	PIN, MAG, ARMATURE CONNECTION
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	A	1	LIGHT SHIELD
	[illegible]	[illegible]	1	BRACKET, LIGHT SHIELD ADJ.
	[illegible]	D	1	PANEL, COSMETIC
	[illegible]	E	1	[illegible], MIRROR
	[illegible]	B	1	TAPE, SUB-MIRROR
	[illegible]	E	1	SHIELD, LIGHT
	[illegible]	E	1	COVER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	COVER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	COVER
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	CUSHION
	[illegible]	E	1	MIRROR UNIT
	[illegible]	E	1	SUB MIRROR UNIT
	[illegible]	B	1	MIRROR RECEPTACLE
	[illegible]	E	1	MIRROR
	[illegible]	E	1	MIRROR, SUB
	[illegible]	E	1	SPRING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PCH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PCH
	[illegible]		1	WASHER
	[illegible]		1	WASHER
	[illegible]		[illegible]	E RING
	[illegible]		1	E RING
	[illegible]		1	RETAINER, [illegible]
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		1	WASHER

B

REF NO. C12-1821,8

CANON AL-1, BLACK AL-1


CA1-5570-000 (See detail)
CA1-5083-000
XC4-0071-070
CY1-4044-000
CY1-1106-000
XA1-1170-187
CA1-3988-000
XA1-1170-187
CA1-3444-000 (See detail)
CA1-3687-000
CA1-3571-000
XA1-1170-187
CS1-0164-000
CY1-9749-000
CF1-0476-000
XG-1793-770
CA1-5003-000
CS1-4002-000
K9
CF1-0472-000
CY1-9749-000
XB1-1738-980
CF1-0475-000
CE1-6203-000
CY1-9749-000
CA1-3873-000
CH3-0063-000
XA1-1170-307
CS1-3443-000 (See detail)
CS1-0155-000
XA1-3170-358
XA1-1170-408
Rotated 180°
XA1-1170-189
WF8-9605-000
XB1-1157-220
XB4-1100-102
CA1-3454-000
CA1-3455-000
CA1-3484-000
CS1-6484-000
CS1-6483-000
K9
CS1-6488-000
CA1-3443-000 detail
Δ SIZE
0.05mm (005)
0.10mm (010)
0.15mm (015)
0.20mm (020)
0.30mm (030)
0.40mm (040)
0.50mm (050)
CA1-3444-000 detail
Δ SIZE
2.2mm (022)
2.6mm (026)
3.0mm (030)
3.4mm (034)
CA1-3570-000 detail
Δ SIZE
0.10mm (010)
0.40mm (040)

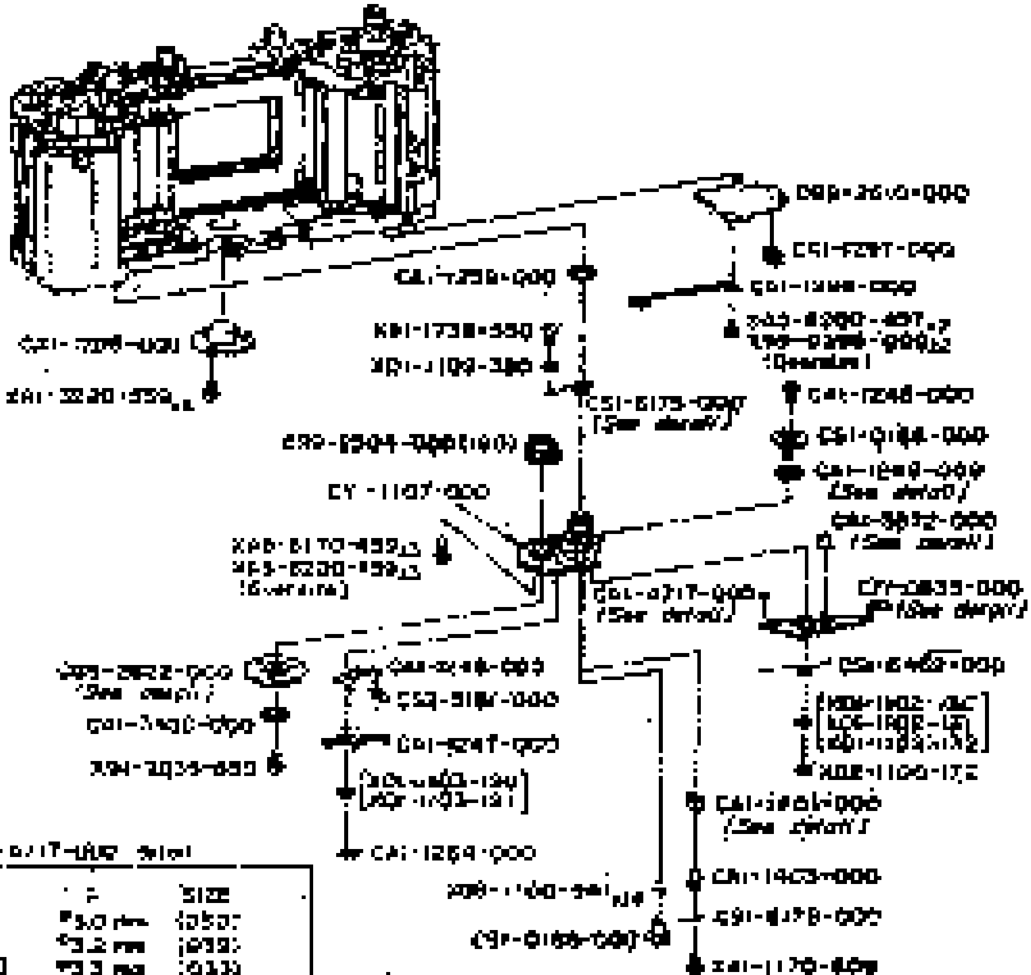
[illegible]

PARTS LIST

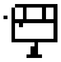
FRONT PANEL

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	0	1	MAGNET, [illegible]
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	0	1	SCREW
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	[illegible]	1	ARMATURE, 1ST RELEASE
	[illegible]	[illegible]	1	CONTACT, [illegible]
	[illegible]	[illegible]	1	CONTACT, [illegible]
	[illegible]	0	1	COVER, LED
	[illegible]	0	1	MAGNET, [illegible]
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	0	1	CONTACT, [illegible]
	[illegible]	[illegible]	1	INSULATOR, [illegible]
	[illegible]	0	1	[illegible], SENSOR [illegible]
	[illegible]	0	1	WASHER
	[illegible]	[illegible]	1	BRUSH, [illegible]
	[illegible]	[illegible]	[illegible]	[illegible], [illegible]
	[illegible]	[illegible]	1	LEVER, [illegible]
	[illegible]	0	1	[illegible] UNIT
	[illegible]	0	1	[illegible] UNIT
	[illegible]	C	1	CONVERTER, DC-DC [illegible]
	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	1	STOPPER
	[illegible]	0	1	SPRING
	[illegible]	[illegible]	1	SPRING [illegible]
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	FRONT PANEL ASSY
	[illegible]	C	1	ELECTRIC PARTS UNIT
	[illegible]	[illegible]	1	HOLDER, 1ST RELEASE
	[illegible]		1	SCREW, CROSS-RECESS, FH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, FCH
	[illegible]		1	SCREW, CROSS-RECESS, FCH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		1	SCREW, CROSS-RECESS, FH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	[illegible]
	[illegible]		1	SCREW, CROSS-RECESS, [illegible]
	[illegible]		1	[illegible]
	[illegible]		1	SCREW, CROSS-RECESS, FCH
	[illegible]		1	SCREW, CROSS-RECESS, PH

CANON AL-1, BLACK AL-1


C99-2610-000
CA1-1297-000
CA1-1739-000
CA1-1258-000
XA1-1730-350
XA5-2020-457
XA5-2230-809
(Overseas)
CA1-7219-000
XD1-1109-390
CA1-6175-000
(See detail)
XA1-3230-359
CA1-1248-000
CA1-0164-000
C99-1504-000(100)
CA1-1249-000
(See detail)
CY1-1107-000
CA1-3572-000
(See detail)
XA6-6170-459
XA5-6230-459
(Overseas)
CA1-6717-000
(See detail)
CY1-0835-000
(See detail)
CA1-3622-000
(See detail)
CA1-6246-000
CA1-6462-000
CA1-5181-000
XD2-1102-
XC6-1102-
XD1-1102-
CA1-3420-000
CA1-6247-000
XA1-2035-859
XD1-1103-190
XD1-1103-191
XD2-1100-172
CA1-1401-000
(See detail)
CA1-1264-000
CA1-1403-000
XA6-1100-561
CA1-6478-000
CA1-0168-000
XA1-1170-409

CA1-6717-000 detail

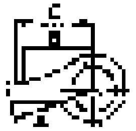


A	SIZE
Φ3.0 mm	(0530)
Φ3.2 mm	(0532)
Φ3.3 mm	(0533)
Φ3.4 mm	(0534)
Φ3.5 mm	(0535)
Φ3.6 mm	(0536)
Φ3.7 mm	(0537) Non
Φ3.8 mm	(0461)
Φ4.0 mm	(0401)

CA1-3572-000 detail

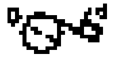
A	SIZE
Φ2.5 mm	(0235) Mag
Φ2.0 mm	(0226) Green
Φ1.8 mm	(0224) Mag
Φ1.2 mm	(0321) Black

CA1-1401-000 detail



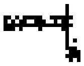
A	B	C	SIZE
R5.2mm	4.3mm	4.85mm	(0561) Non
R5.7mm	4.4mm	3.35mm	(0571) Orange

CA1-6175-000 detail



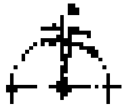
A	D	SIZE
0.70 mm	Φ6.3mm	(3033)
0.50mm	Φ6.4mm	(3040)
0.70mm	Φ6.6mm	(3050)

CA1-1246-000 detail



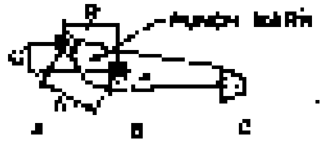
A	SIZE
0.1mm	(1021)
0.2mm	(1201)

CA1-3622-000 detail



D	SIZE	SCREW
67°	(0601)	Black
54°	(0501)	

CY1-0835-000 detail



A	B	C	SIZE
12.42mm	12.49mm	1.48mm	(0405) No Mark
12.60mm	12.67mm	1.60mm	(0444) Mark

[illegible]

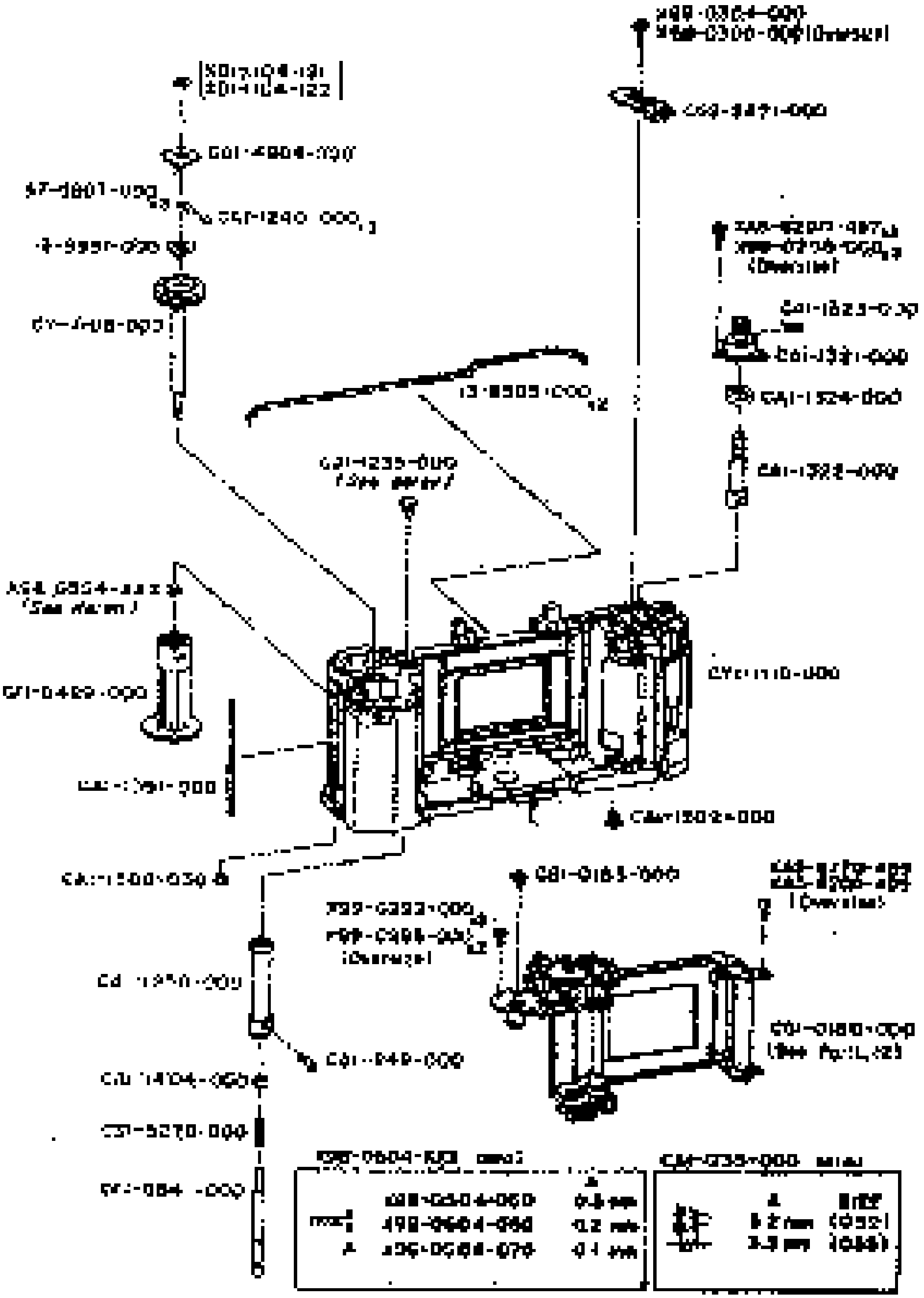
PARTS LIST

[illegible]

ITEM	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	C	2	SCREW, [illegible]
	[illegible]	D	1	SCREW, LEFT HANDED
	[illegible]	E	1	SPACER
	(ENTER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	D	2	LEVER, RA 1
	[illegible]	D	1	LEVER, RA 2
	[illegible]	F	1	SHIELD, LIGHT
	[illegible]	C	2	E RINGS
	[illegible]	A	1	BASE, [illegible]
	[illegible]	C	1	CAM
	[illegible]	D	1	DIAL
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	D	1	COLLAR, ECCENTRIC
	[illegible]	A	1	COUPLER, WINDING
	[illegible]	D	1	COLLAR
	(ENTER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	E	1	COLLAR
	(ENTER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	D	1	LEVER, CONNECTING
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible] (100)	A	1	SPOOL GEAR UNIT
	[illegible]	D	1	ELECTRIC PARTS UNIT
	[illegible]	A	1	GEAR, CHANGE UNIT
	(ENTER SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	C	1	GEAR
	[illegible]	[illegible]	1	GEAR
	[illegible]	B	1	SPRING
	(ENTER SIZE WHEN ORDERING. SEE DETAIL)			
	[illegible]	[illegible]	1	SPRING
	[illegible]	E	1	SPRING
	[illegible]	E	1	SPRING, COIL
	[illegible]	A	1	BASE, WINDING
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		2	SCREW, CROSS-RECESS, [illegible]
	[illegible]		3	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	WASHER
	[illegible]		2	WASHER
	[illegible]		1	WASHER
	[illegible]		1	WASHER
	[illegible]		1	WASHER
	[illegible]		1	WASHER
	[illegible]		1	E RING
	[illegible]		14	BALL, STEEL
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		2	SCREW, CROSS-RECESS, PH

REF. NO. C19-1021,2

CANON AL-1, BLACK AL-1



X01-7104-121
X01-4104-122
CA1-4904-000
97-1801-050
CA1-1240-000
CA1-9991-000
CY-7408-000
13-8505-000
CA1-1235-000
(See Note)
X99-0364-000
X99-0300-000 (Oversize)
CA1-1471-000
X99-0207-457
X99-0798-000
(Oversize)
CA1-1523-000
CA1-1521-000
CA1-1524-000
CA1-1522-000
X64-0854-222
(See Note)
CA1-0489-000
CA1-1251-000
CY1-1110-000
CA1-1502-000
CA1-1500-000
CA1-1250-000
CA1-1404-000
CA1-1049-000
CA1-5270-000
CA1-1084-000
CA1-0165-000
X99-0393-000
X99-0398-000
(Oversize)
X99-0172-000
X99-0202-000
(Oversize)
CY1-0180-000
(See Fig. 1, 2)
X98-0604-XXX (Shim)
X98-0604-060 0.6 mm
X98-0604-080 0.8 mm
X98-0604-070 0.7 mm
A
CA1-1235-000 (Shim)
A
0.2 mm (032)
0.3 mm (033)

[illegible]

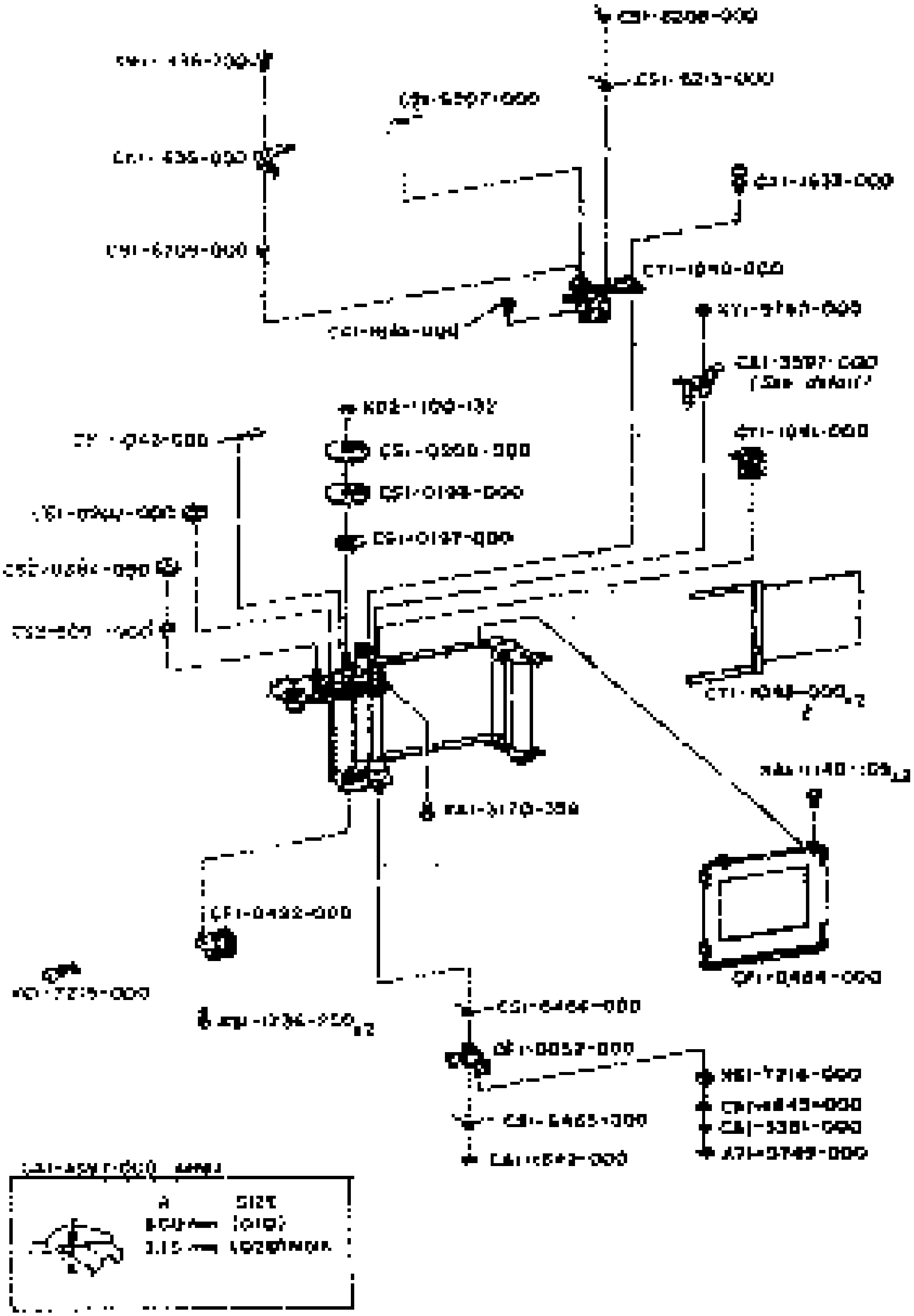
PARTS LIST

SPOOL & SPROCKET

REF.	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	[illegible]	[illegible]	LIGHT SHIELD
	[illegible]	[illegible]	1	CLUTCH PIN
	[illegible]	[illegible]	[illegible]	COIL SPRING
	[illegible]	[illegible]	1	BRACE, SHUTTER GUIDE
	[illegible]	[illegible]	1	SCREW
	(SPECIFY SIZE WHEN ORDERING, SEE DETAIL)			
	[illegible]	[illegible]	[illegible]	ROLLER
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	SPROCKET
	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	1	HOUSING, [illegible]
	[illegible]	[illegible]	1	SHAFT, [illegible]
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	COVER, [illegible]
	[illegible]	[illegible]	1	SHIELD, LIGHT
	[illegible]	[illegible]	1	COLLAR
	[illegible]	[illegible]	1	[illegible], COVER
	[illegible]	[illegible]	1	SPOOL
	[illegible]	[illegible]	1	SHAFT, SPROCKET
	[illegible]	[illegible]	1	SHUTTER [illegible]
	[illegible]	[illegible]	1	[illegible], SHUTTER [illegible]
	[illegible]	[illegible]	[illegible]	IDLER, [illegible]
	[illegible]	[illegible]	[illegible]	SPRING, COIL
	[illegible]	[illegible]	[illegible]	SHAFT, [illegible]
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]		[illegible]	SCREW, CROSS RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	WASHER
	[illegible]		[illegible]	WASHER
	[illegible]		[illegible]	WASHER
	[illegible]		1	WASHER
	[illegible]		1	WASHER
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, [illegible]
	[illegible]		1	SCREW, CROSS-RECESS, [illegible]

REF NO. C12-1521, 2

CANON AL-1, BLACK AL-1



CS1-6208-000
CS1-6213-000
CS1-1436-000
CS1-6597-000
CS1-1436-000
CS1-1633-000
CS1-6709-000
CT1-1040-000
CS1-1046-000
XY1-5140-000
CA1-3597-000
(See detail)
K02-1100-132
CT1-1041-000
CY1-1042-000
CS1-0200-000
CS1-0194-000
CS1-0944-000
CS1-0197-000
CS2-0584-000
CS2-509-1400
CT1-1048-000 ×2
RA1-3170-350
XA1-1140-100 ×2
CF1-0492-000
CF1-0464-000
XO1-7215-000
XB1-1736-250 ×2
CS1-6464-000
CF1-0052-000
XS1-7214-000
CS1-6465-000
CS1-6445-000
CA1-5381-000
CA1-6542-000
XY1-5745-000
CA1-3597-000 ASSY
A
SIZE
0.04 mm
(012)
3.15 mm
(020)

[illegible]

[illegible]

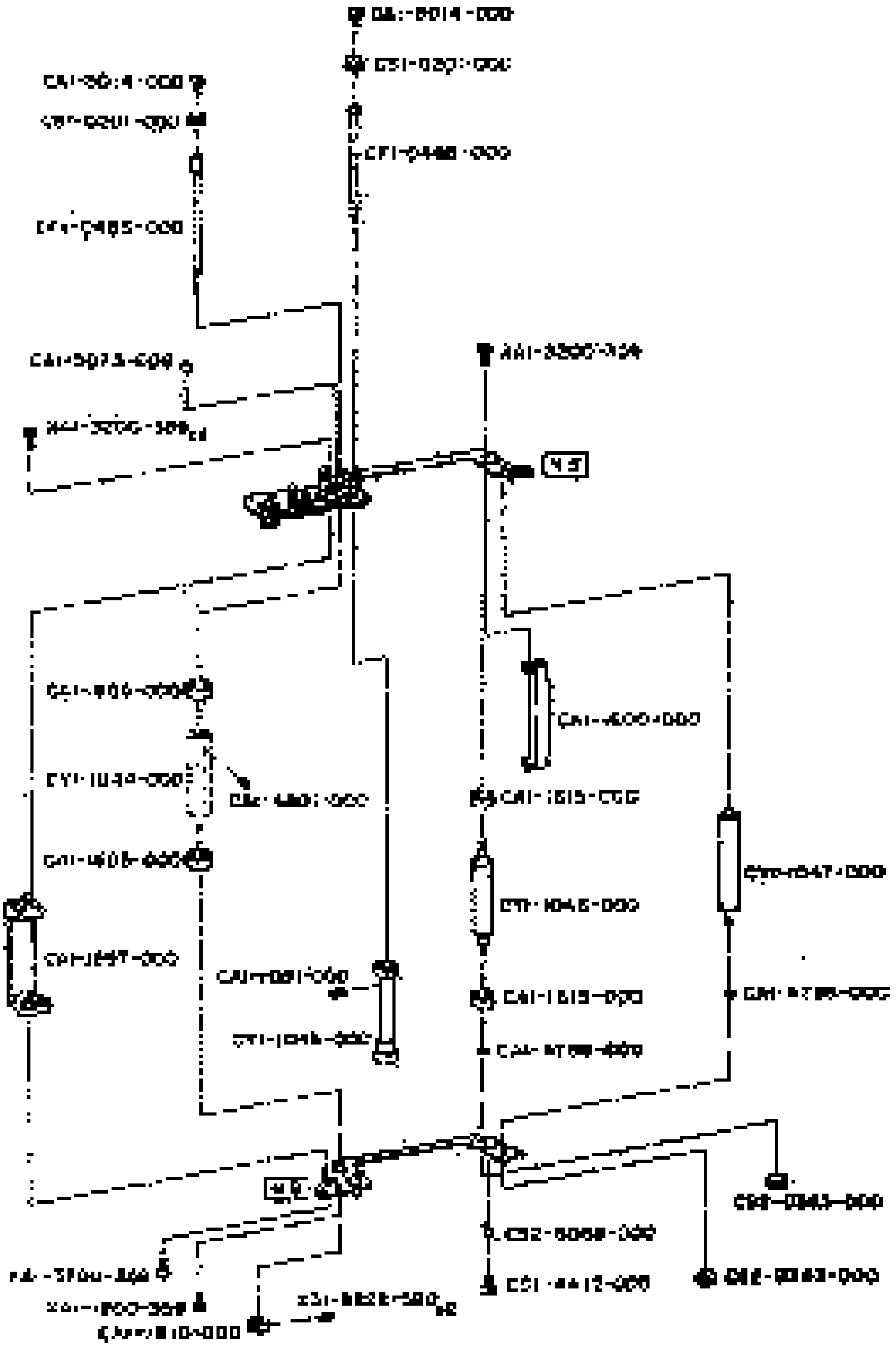
[illegible]

PARTS LIST

[illegible]

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	[illegible]	1	STUD
	[illegible]	[illegible]	1	[illegible], [illegible], SHOULDER
	[illegible]	[illegible]	1	LEVER
	[illegible]	[illegible]	[illegible]	E RING
	[illegible]	[illegible]	[illegible]	WASHER
	[illegible]	[illegible]	[illegible]	RETAINER
	[illegible]	[illegible]	1	LEVER, 1ST CURTAIN LATCH
	([illegible] [illegible] EACH THICKNESS, SEE DETAIL)			
	[illegible]	[illegible]	1	SHIELD, LIGHT
	[illegible]	[illegible]	1	MAGNET, SHUTTER
	[illegible]	[illegible]	1	LEVER, ARMATURE
	[illegible]	[illegible]	[illegible]	GEAR
	[illegible]	[illegible]	1	GEAR
	[illegible]	[illegible]	1	GEAR
	[illegible]	[illegible]	1	GEAR, IDLER
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	[illegible]	SPRING
	[illegible]	[illegible]	[illegible]	SPRING
	[illegible]	[illegible]	[illegible]	SPRING
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	GEAR, IDLER
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	1	BASE, BRAKE
	[illegible]	[illegible]	[illegible]	2ND CURTAIN BRAKE
	[illegible]	[illegible]	[illegible]	CONTACT
	[illegible]	[illegible]	[illegible]	CURTAIN
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH
	[illegible]		1	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	E-RING
	[illegible]		[illegible]	CORE, MAGNET
	[illegible]		1	ARMATURE
	[illegible]		1	RETAINER
	[illegible]		1	RETAINER
	[illegible]		1	SCREW, CROSS-RECESS, PH
	[illegible]		[illegible]	SCREW, CROSS-RECESS, PH

CANON AL-1, BLACK AL-1


CA1-8014-000
CS1-0207-000
CA1-8014-000
CS1-0201-000
CY1-9448-000
CY1-9485-000
CA1-5073-000
XA1-3300-304
XA1-3200-308
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CA1-1606-000
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CA1-1608-000
CA1-1257-000
CA1-1081-000
CY1-1046-000
CA1-1600-000
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CA1-1615-000
CA1-8789-000
CA1-8789-000
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CS2-0063-000
CS2-5068-000
XA1-3700-308
CS1-4412-000
CS2-9063-000
XA1-1700-308
XS1-8826-590
CA1-1610-000

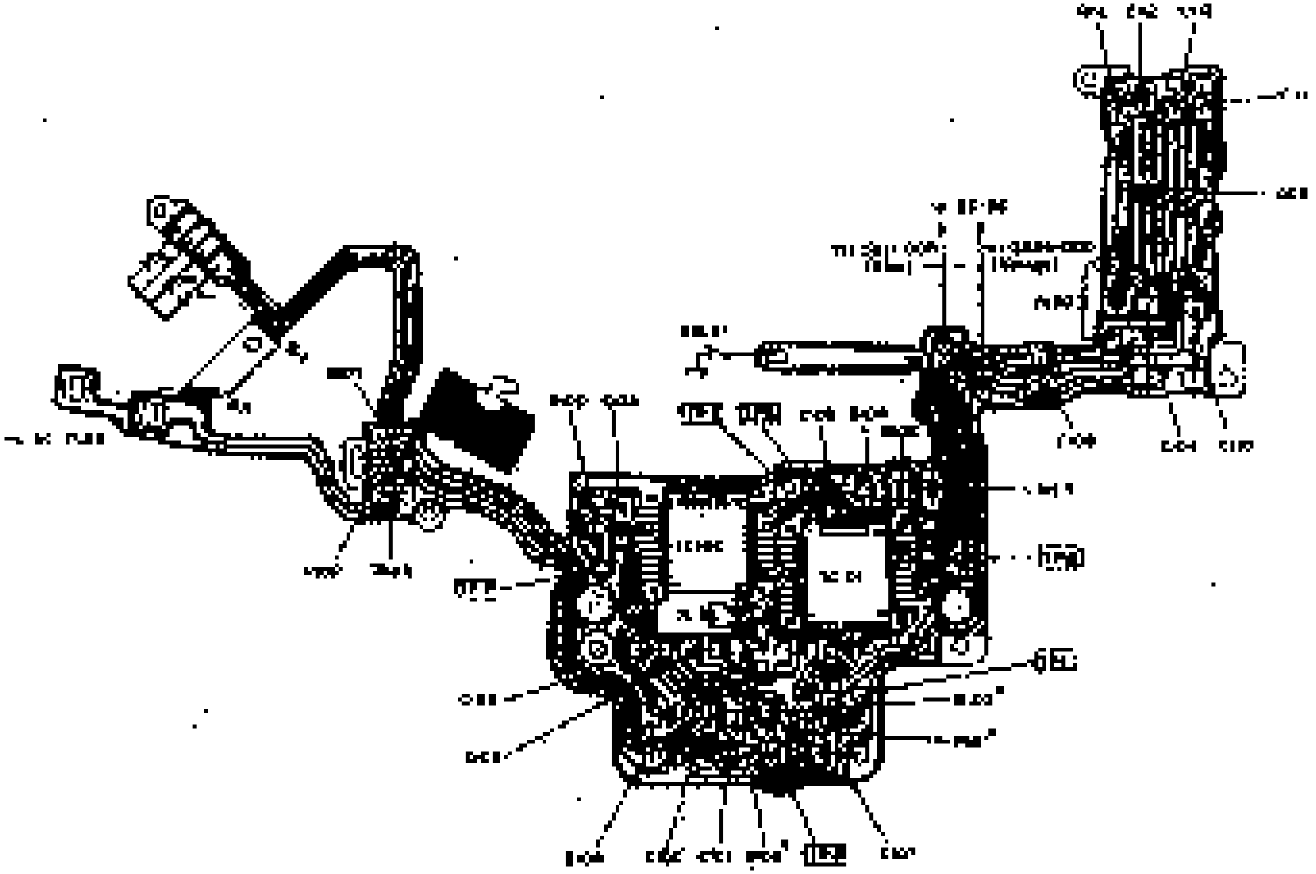
PARTS LIST

SHUTTER PART 2

MARK	PART NO.	CLASS	QTY	DESCRIPTION
	[illegible]	[illegible]	1	PIN, SPRING
	[illegible]	[illegible]	1	HANGER, VERTICAL
	[illegible]	[illegible]	1	MEMBER, VERTICAL
	[illegible]	[illegible]	2	PULLEY
	[illegible]	[illegible]	1	CAM, CURTAIN LATCH
	[illegible]	[illegible]	2	PULLEY
	[illegible]	[illegible]	[illegible]	WASHER
	[illegible]	[illegible]	[illegible]	SCREW, ALIGNMENT PIN
	[illegible]	[illegible]	[illegible]	SCREW
	[illegible]	[illegible]	1	[illegible]
	[illegible]	[illegible]	[illegible]	SHAFT, 1ST DRUM
	[illegible]	[illegible]	1	SHAFT, 2ND DRUM
	[illegible]	[illegible]	[illegible]	GEAR, PINION
	[illegible]	[illegible]	[illegible]	SCREW
	[illegible]	[illegible]	[illegible]	GEAR
	[illegible]	[illegible]	1	SPRING
	[illegible]	[illegible]	[illegible]	DRUM, 2ND CURTAIN
	[illegible]	[illegible]	1	HOLDER, 1ST CURTAIN
	[illegible]	[illegible]	1	SPRING DRUM, 1ST CURTAIN
	[illegible]	[illegible]	1	SPRING DRUM, 2ND CURTAIN
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	SCREW, CROSS-RECESS, [illegible]
	[illegible]		[illegible]	[illegible], HEXAGON SOCKET, [illegible]

CANON AL-1, BLACK AL-1

ELECTRIC PARTS UNIT
AF FLEX



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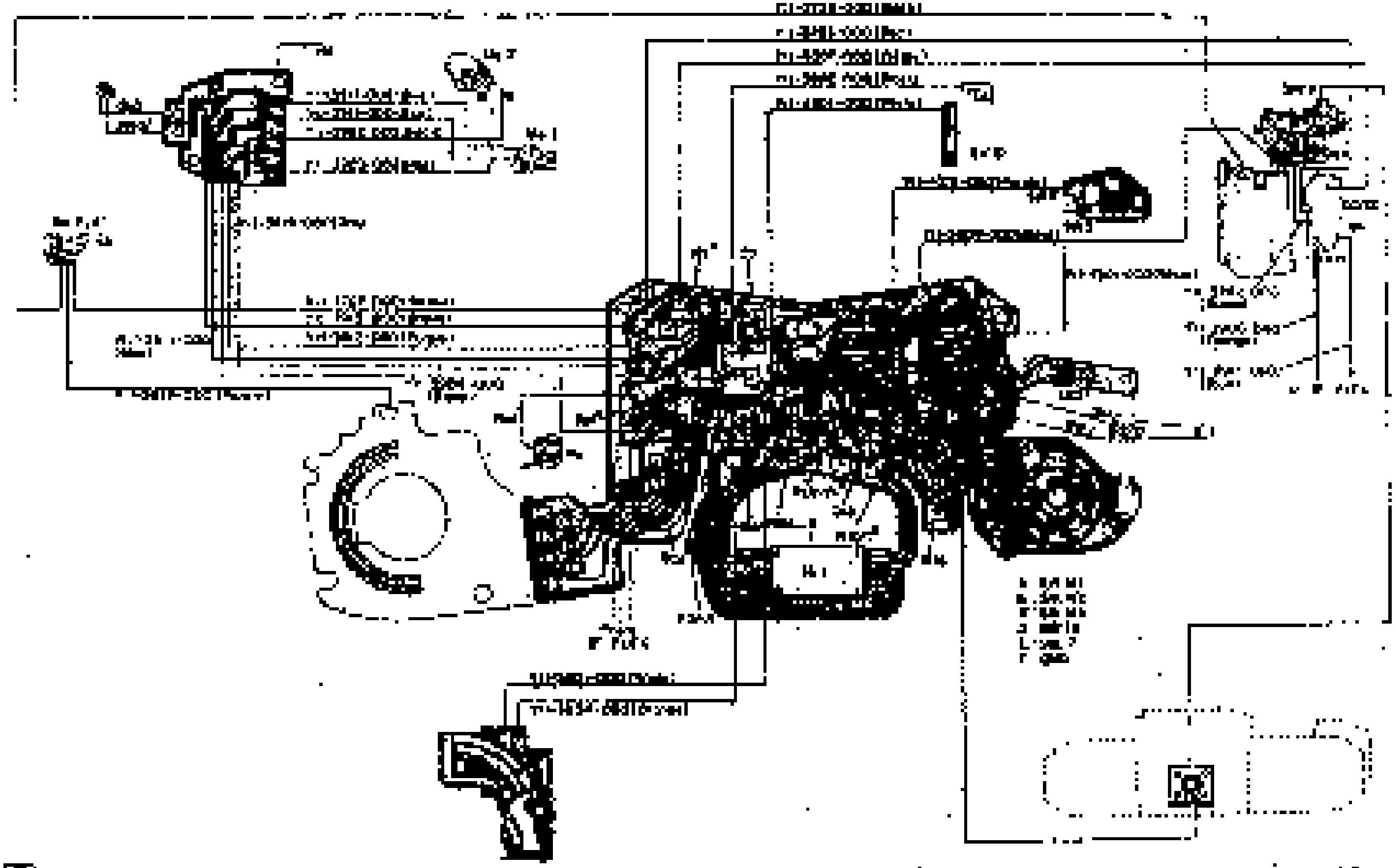
REF NO C13-1601,2

ELECTRIC PARTS UNIT
WIRING DIAGRAM
AG FLEX (6th Type)

CANON AL-1, BLACK AL-1



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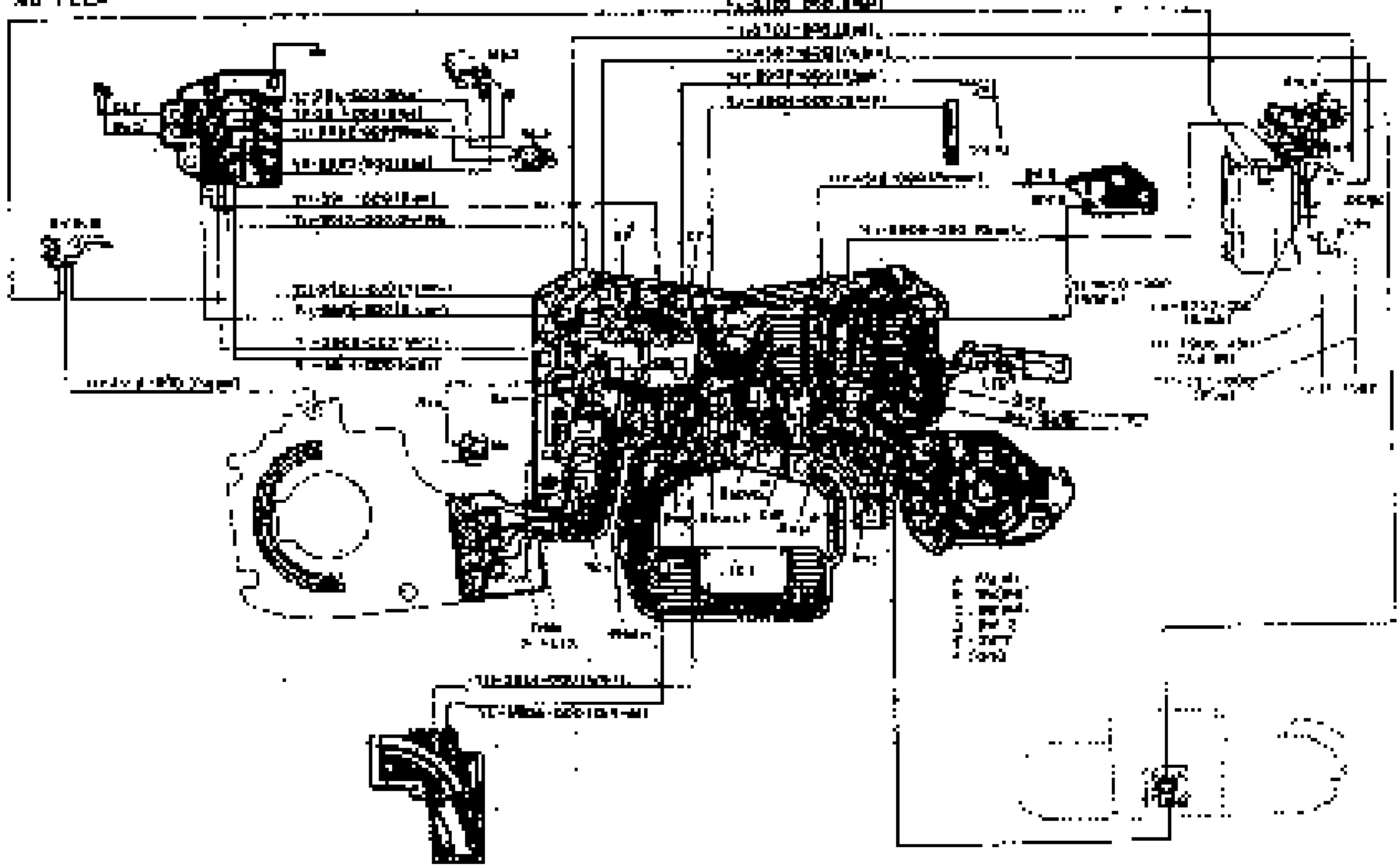
[illegible]

CANON AE-1, BLACK AE-1

ELECTRIC PARTS UNIT
WIRING DIAGRAM
AE FLEX



[illegible]

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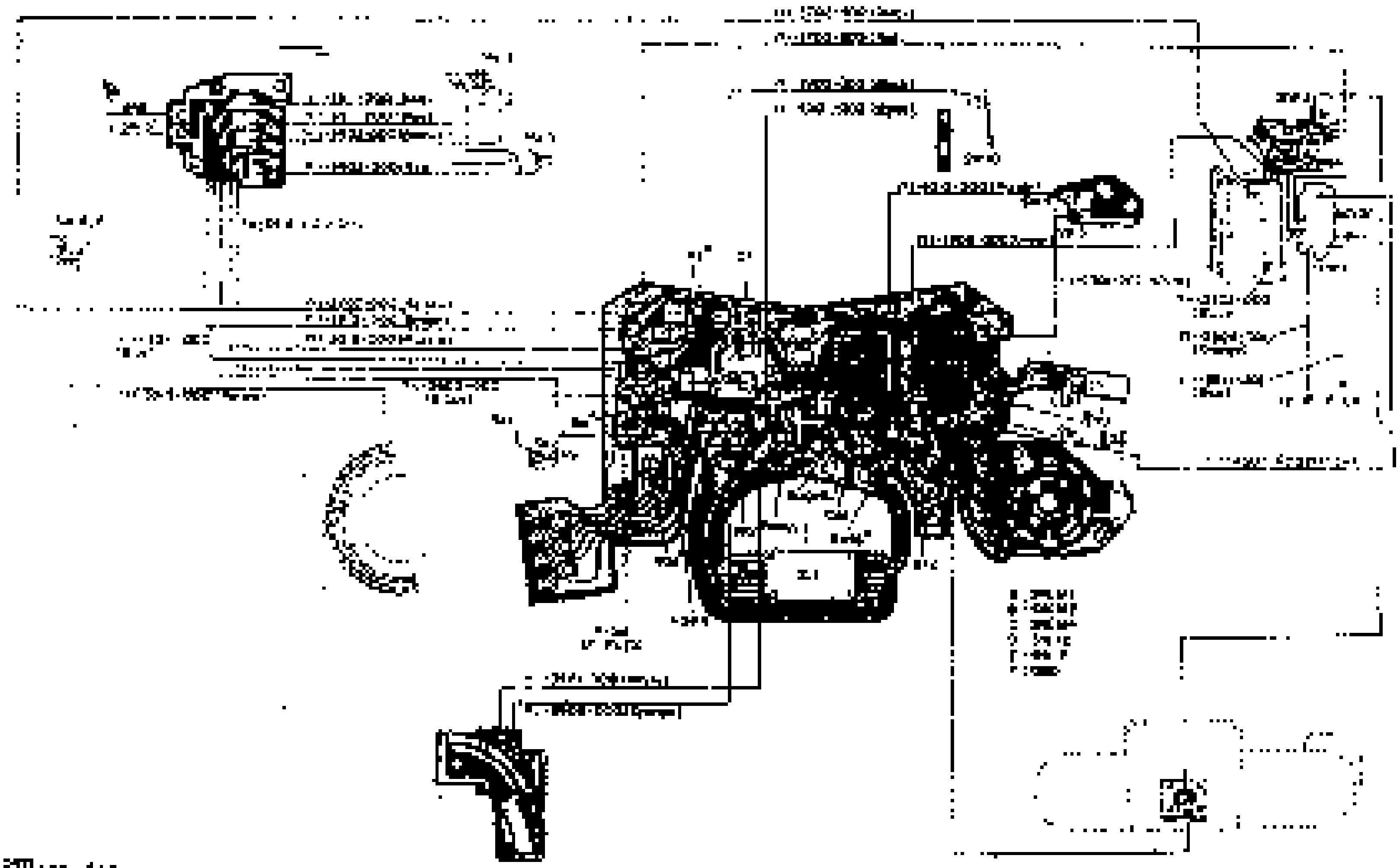
ELECTRIC PARTS UNIT
WIRING DIAGRAM
DC FLEX (3rd type)

CANON AL-1 BLACK AL-1

[illegible]



[illegible]

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PARTS LIST

[illegible]

SYMBOL	PART NO.	[illegible]	DESCRIPTION	REMARKS	
[illegible]			CAPACITOR, CERA.	0.01 uF	[illegible]
[illegible]			CAPACITOR, CERA.	1000 pF	[illegible]
[illegible]			CAPACITOR, CERA.	[illegible]	[illegible]
[illegible]			CAPACITOR, CERA.	0.01 uF	25V
[illegible]			CAPACITOR, TANTA.	[illegible] uF	10V
[illegible]			CAPACITOR, TANTA.	[illegible] uF	[illegible]
[illegible]			CAPACITOR, CERA.	[illegible]	16V
[illegible]			CAPACITOR, TANTA.	[illegible] uF	16V
[illegible]			CAPACITOR, CERA.	0.1 uF	25V
[illegible]			CAPACITOR, CERA.	0.1 uF	16V
[illegible]			CAPACITOR, TANTA.	[illegible] uF	[illegible]
[illegible]			CAPACITOR, CERA.	0.1 uF	[illegible]
[illegible]			CAPACITOR, CERA.	0.1 uF	[illegible]
[illegible]			CAPACITOR, CERA.	0.1 uF	25V
[illegible]			CAPACITOR, TANTA.	1 uF	[illegible]
[illegible]			CAPACITOR, TANTA.	[illegible] uF	[illegible]
[illegible]			CAPACITOR, TANTA.	[illegible] uF	[illegible]
[illegible]					
IC1	[illegible]	[illegible]	IC	[illegible]	
IC2	[illegible]	[illegible]	IC	[illegible]	
[illegible]	[illegible]	[illegible]	IC	[illegible]	
[illegible]	[illegible]	[illegible]	IC	[illegible]	
LED	[illegible]	[illegible]	LED	[illegible]	
[illegible]	[illegible]	[illegible]	LED	[illegible]	
[illegible]	[illegible]	[illegible]	RESISTOR	[illegible]	1/4W
R101	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
R102	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
R103	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
	[illegible]	[illegible]	RESISTOR	[illegible] KOHM,	1/4W
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PARTS LIST

ELECTRIC PARTS & LEADS

SYMBOL	PART NO	CLASS	DESCRIPTION	REMARKS
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	[illegible]	[illegible]	RESISTOR	11.5 KOHM, [illegible]
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	[illegible]	[illegible]	RESISTOR	12.4 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	12.7 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	13.0 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	13.3 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	13.7 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	14.0 KOHM, [illegible]
	[illegible]	[illegible]	RESISTOR	14.3 KOHM, [illegible]
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[illegible]			RESISTOR	[illegible]
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[illegible]	[illegible]	[illegible]	RESISTOR	270 OHM, [illegible]
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PARTS LIST

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PARTS LIST

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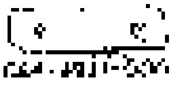
CANON CASE FOR AL-1

REF. NO C46-115-17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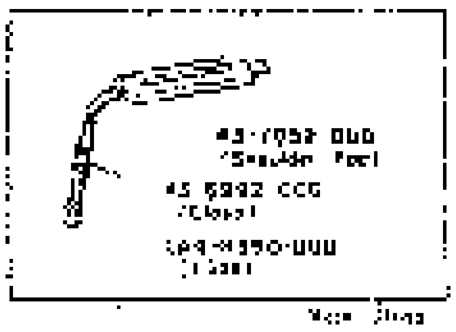
C54-1149-000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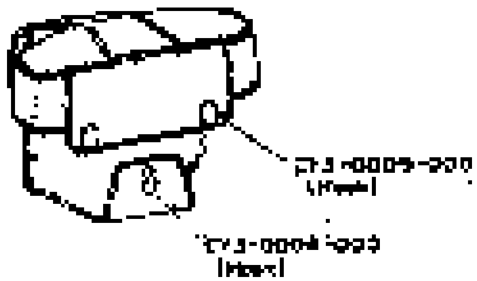
45-5992-000
(Clasp)
CA4-4350-000
(Strap)
Main Strap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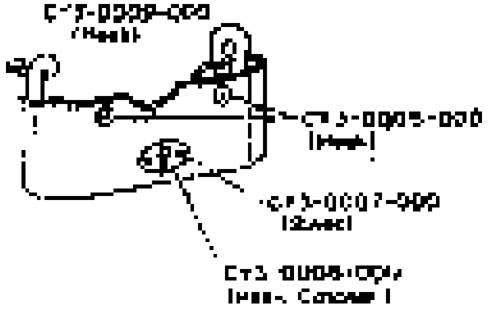
(Hook)
CY3-0004-000
(Rivet)


CY3-0009-000
(Hook)
CY3-0005-000
(Hook)
CY3-0007-000
(Rivet)
CY3-0006-000
(Hook Catcher)

REF. NO. C46-5211,3

CASE PARTS LIST

FIG.	PART NO.	CLASS	QTY	DESCRIPTION
	45-5992-000	D	1	CLASP
	45-7052-000	D	1	PAD, SHOULDER
	CA4-4350-000	D	1	STRAP
	CA4-1911-000	E	1	[illegible], NAMEPLATE
	C54-1149-000	C	1	NAME PLATE FOR CASE
	CY3-0004-000	D	1	RIVET,
	CY3-0005-000	D	1	HOOK
	CY3-0006-000	D	1	HOOK, CATCHER
	CY3-0007-000	D	1	RIVET
	CY3-0009-000	C	1	HOOK